THE PHILIPPINE
JOURNAL OF SCIENCE

VOL. 34 DECEMBER, 1927 NO. 4

NEW STEPHANIDÆ FROM BORNEO AND THE PHILIPPINE ISLANDS, III

By E. A. ELLIOTT

Fellow of the Zoological Society of London and of the Entomological Society of London

Subfamily DIASTEPHANUS

This subfamily shows the lowest form of development of the neuration. The group in which the anterior frontal tubercle is wanting and that in which the two femoral teeth are white appear to be closely related, differing chiefly in the proportions of the basal antennal joints, the presence or absence of a border to the posterior margin of the head, and, in a lesser degree, in details of sculpture and color. The substitution of bristles for the usual smaller teeth or serrations at the base of the femora, behind the first large tooth, occurs in many species, but the entire substitution, between and in front of the large teeth, in only a very few species.

Key to species of Diastephanus.

20. 1. Hind femora tridentate.
11. 2. All femoral teeth white.
8. 3. With small teeth between the larger ones.
5. 4. Frons apically white, the upper border forming a W. **D. trialbatus** sp. nov.
4. 5. Head otherwise colored.
7. 6. Head black, frons ferrugineous to flavous, vertex and occiput transstriate to rugose; metapleuræ and median segment confluent..... **D. pallescens** Schletterer.

6. 7. Head rufescent, frons and cheeks flavescent; occiput centrally punctate; metapleuræ and median segment separated by a carina..... **D. multicolor** sp. nov.
3. 8. Small teeth between larger ones replaced by bristles.
10. 9. Head red-brown, part yellow; red spot on second tergite; hind metatarsi white ..... **D. flavifrons** Kieffer.
9. 10. Head black, part white, white spot on second tergite; hind metatarsi rufous..... **D. leucostictus** Kieffer.
2. 11. Hind femoral teeth not all white.
13. 12. Two apical teeth white, the basal brown or black. **D. annulipes** sp. nov.
12. 13. All femoral teeth concolorous with femora.
15. 14. Occiput and neck very short..... **D. curticollis** sp. nov.
14. 15. Occiput and neck more or less elongate.
17. 16. Hind coxæ cylindrical; frons, vertex, and occiput finely and evenly transstriate..... **D. lucifer** sp. nov.
16. 17. Hind coxæ clavate.
19. 18. Frons granulate rugose, mesonotum transrugose, second abdominal segment not elongate..... **D. elongatus** sp. nov.
18. 19. Frons coarsely arcuate striate, mesonotum nearly smooth; second abdominal segment much elongate..... **D. longior** sp. nov.
1. 20. Hind femora bidentate.
32. 21. Femoral teeth white.
25. 22. Anterior frontal tubercle present.
24. 23. Hind coxæ normal.
23b. 23a. Terebra longer than body, white-banded..... **D. levis** sp. nov.
23a. 23b. Terebra as long as body, black..... **D. punctinotum** sp. nov.
23. 24. Hind coxæ strongly clavate; terebra shorter than body, rufescent. **D. clavicoxis** sp. nov.
22. 25. Anterior frontal tubercle obsolete.
29. 26. Posterior margin of head bordered.
28. 27. Frons arcuate striate, vertex and occiput rugose; third flagellar joint much longer than first and second together; petiole shorter than rest of abdomen..... **D. albidens** Kieffer.
27. 28. Frons and occiput finely, vertex coarsely transstriate; antennæ normal; petiole as long as rest of abdomen. **D. albonotatus** Elliott.
26. 29. Posterior margin of head not bordered.
31. 30. White or flavous spot on third abdominal segment. **D. flavonotatus** Elliott.
30. 31. No spot on third segment..... **D. leucodontus** Schletterer.
21. 32. Hind femoral teeth concolorous with femora.
36. 33. Frons, vertex, and occiput finely transstriate.
35. 34. Posterior margin of head bordered; terebra rufescent. **D. parvulus** sp. nov.
34. 35. Posterior margin of head simple; terebra white-banded. **D. semiglaber** sp. nov.
33. 36. Head differently sculptured.
33. 37. Frons, vertex, and occiput arcuate striate; mesonotum with three longitudinal impressions; hind coxæ strongly clavate. **D. clavatus** sp. nov.

37. 38. Frons arcuate costate, vertex and occiput finely transstriate; mesonotum without the usual impressions; coxæ normal.
D. costifrons sp. nov.

DIASTEPHANUS TRIALBATUS sp. nov., female and male.

Male.—Frons apically transstriate, basally more granulately, with a few punctures, posterior tubercles distinct, four carinæ on vertex, behind which it is finely transstriate, then superficially punctate, occiput basally smooth, posterior margin of head strongly bordered; scape as long as cheeks and, like the first flagellar joint, stout, second joint scarcely longer than first, third nearly as long as first and second together; pronotum finely transstriate, becoming gradually finer toward the smooth base; mesonotum with three rows of punctures very close together, lateral angles feebly rugose; scutellum centrally smooth, lateral lobes indistinctly sculptured and dull; mesopleuræ smooth; metapleuræ coarsely punctate, separated apically only by a more or less distinct carina from the median segment, which is centrally superficially and diffusely, apically and laterally more closely punctate and dull; petiole transstriate, shorter than the remaining smooth shining segments. Hind coxæ transstriate, femora extremely finely transaciculate, tridentate, tibiæ compressed in basal two-thirds, metatarsi scarcely longer than the remaining joints. Radius emitted from apical fifth of stigma, its distal section twice as long as the proximal.

Black; head beneath, cheeks, outer orbits, and frons to about the level of the middle of the eyes white, above this the frons is black, the junction of the two colors forming a distinct W; apices of tubercles and the carinæ on vertex bright red, rest of head black; two or three antennal joints and the anterior legs rufotestaceous, apices of hind coxæ and femora, a spot on each side of second tergite, the femoral teeth and hind metatarsi white; nervures red-brown.

Female.—Agrees in sculpture with the male, but the frons is apically flavous, passing into reddish, and the black color does not come down quite as low and is less sharply demarcated. Terebra rufescent, shorter than body.

Length, male, 7 to 8.5 millimeters; abdomen, 4.5 to 5; petiole, 2. Female, 9.5 millimeters; abdomen, 5.5; petiole, 2.5; terebra, 8.

BORNEO, Sandakan (*Baker*).

This species belongs to the small group with three white femoral teeth. The sculpture of the head and median segment is distinctive, as is also the striking marking of the frons, in which

it resembles my *D. albifrons* which, however, has bidentate femora with concolorous teeth.

DIASTEPHANUS PALLESCENS Schletterer, female and male.

Diastephanus pallescens SCHLETTERER, Berl. Ent. Zeit. 33 (1889) 123, female.

Male.—Frons finely, indistinctly transrugose, occiput coarsely granulate rugose; posterior tubercles broad, posterior margin of head bordered; scape slightly longer than cheeks, antennæ about normal; neck elongate, finely transstriate, semiannular basally smooth; mesonotum irregularly rugose, central line of punctures distinct; scutellum centrally dull, lateral lobes lightly punctate; mesopleuræ smooth; metapleuræ and median segment indistinctly separated, reticulate punctate, former more coarsely; petiole transstriate, shorter than rest of abdomen. Hind coxæ transstriate, femora finely transaciculate, rather dull, tibiæ longer than femora, compressed in basal two-thirds, metatarsi about as long as the remaining joints. Radius emitted from near apex of stigma, its distal section about twice as long as the proximal.

Black; mandibles except apices, head beneath, frons, and scape flavescent, remainder of head red; flagellum basally rufescent, becoming black toward apex; anterior legs and hind trochanters rufescent; middle metatarsi basally and hind ones entirely whitish; femoral teeth white. All nervures rufescent.

Length, 10 millimeters; abdomen, 6.5; petiole, 3.5.

BORNEO, Sandakan (*Baker*).

I have little doubt that this is the male of Schletterer's *D. pallescens*. The sculpture is somewhat finer, but agrees in all essentials.

DIASTEPHANUS MULTICOLOR sp. nov., male.

Male.—Frons elongate, subgranulately, vertex and occiput evenly transstriate, latter centrally with large superficial punctures and longitudinal impression, posterior margin of head bordered finely, posterior tubercles broad, three carinæ behind posterior ocelli; scape as long as cheeks, antennæ normal; pronotum finely transaciculate, basally narrowly smooth, neck elongate, basal half longitudinally impressed; mesonotum centrally smooth, laterally slightly rugose, central row of punctures distinct, lateral ones basally only; scutellum centrally smooth, lateral lobes lightly punctate; mesopleuræ smooth, basally transaciculate, metapleuræ diffusely punctate above, laterally rugose,

separated by a carina and a crenulate sulcus from the reticulate punctate median segment; petiole transstriate, shorter than the remaining smooth shining segments. Hind coxæ transstriate, femora and tibiæ transaciculate, the former tridentate, latter compressed in basal two-thirds, metatarsi not much longer than the remaining joints. Radius emitted from apical fourth of stigma, its distal section one and a half times as long as the proximal.

Black; base of mandibles, frons, cheeks, and head beneath flavescent, rest of head rufescent; pronotum centrally longitudinally black, laterally red, rufotestaceous beneath; petiole apically, second and third segments basally, and the hind legs rufescent, anterior legs light red, middle and hind metatarsi yellowish; femoral teeth distinctly white on one leg, more rufescent on the other.

Length, 10 millimeters; abdomen, 6; petiole, 2.5.

BORNEO, Sandakan (*Baker*).

DIASTEPHANUS FLAVIFRONS Kieffer, female and male.

Diastephanus flavifrons KIEFFER, Philip. Journ. Sci. § D 11 (1916) 408, male.

Kieffer knew only the male, and I only tentatively place here one female. It agrees well with the description of the male; the median segment may be somewhat more punctate; the terebra is shorter than the body, rufescent, and the spot on third tergite obsolete.

A male from Sandakan and one from Butuan differ in having the head light red and the pale marks on abdomen barely perceptible.

Length, male, 6 to 8 millimeters. Female, 7.5 millimeters; abdomen, 5; petiole, 2; terebra, 7.

BORNEO, Sandakan. MINDANAO, Butuan (*Baker*).

DIASTEPHANUS LEUCOSTICTUS Kieffer, female and male.

Diastephanus leucostictus KIEFFER, Philip. Journ. Sci. § D 11 (1916) 409, female and male.

These specimens agree with Kieffer's description in sculpture and in the general color; the white on the head is often more restricted, the vertex sometimes nigrescent, and the anterior femora rarely dorsally darker. This and the preceding species have the usual small denticulations between the large teeth on hind femora replaced by bristles and are very much alike; the chief differences appear to lie in the proportions of the basal

antennal joints, the point of emission of the radius, and in the color.

BORNEO, Sandakan (*Baker*).

DIASTEPHANUS ANNULIPES sp. nov., female.

Female.—Frons basally arcuately, apically transversely striate, vertex and occiput finely transstriate, latter basally smooth with fine longitudinal impression, three carinæ on vertex, posterior tubercles distinct, ocellar space finely striate, posterior margin of head bordered; scape as long as cheeks, antennæ normal; neck elongate, finely transstriate, basally almost smooth, semiannular apically transstriate, basally broadly smooth; mesonotum rugose, with three fine, feebly punctate impressions; scutellum smooth; mesopleuræ smooth above, otherwise feebly punctate; metapleuræ and median segment confluent, rather irregularly reticulate punctate; petiole transstriate, very little shorter than the remaining smooth, shining segments; terebra shorter than body, black. Hind coxæ transstriate, subclavate, rather longer than the finely transaciculate, tridentate femora, tibiæ smooth, shining, compressed to middle, metatarsi half as long again as the remaining joints. Radius emitted from apical fifth of stigma, its distal section half as long again as the proximal.

Black; head and two or three basal antennal joints red, anterior legs rufotestaceous, middle tibiæ and metatarsi basally white-ringed, hind tarsi rufescent; the two basal femoral teeth white, the apical black or red. Wings hyaline, nervures and stigma red-brown.

Length, 11 millimeters; abdomen, 6.5; petiole, 3; terebra, 9.

SINGAPORE. BORNEO, Sandakan (*Baker*).

Distinguished by the peculiar color of the femoral teeth and by the sculpture of the head.

DIASTEPHANUS CURTICOLLIS sp. nov., female.

Female.—Frons finely transstriate, vertex and the very short occiput subgranulately transstriate, two inconspicuous carinæ between the posterior ocelli, posterior margin of head simple, posterior tubercles distinct; scape shorter than cheeks, antennæ normal; pronotum short and smooth, neck barely half as long as the semiannular; mesonotum centrally smooth, with three fine longitudinal impressions, laterally slightly rugose; meso- and metapleuræ smooth, latter apically punctate, separated by an incomplete carina from the median segment, which is centrally

longitudinally punctate, otherwise smooth and rather dull; petiole finely transstriate, very little shorter than the remaining smooth shining segments; terebra longer than body, rufescent. Hind coxæ coarsely transrugose, about as long as the smooth, inflated, tridentate femora, tibiæ longer than the femora, compressed in basal two-thirds, metatarsi twice as long as the remaining joints. Radius emitted from apical third of stigma, its basal section three times as long as the proximal.

Black; frons and three or four basal antennal joints rufotestaceous, outer orbits whitish, vertex and occiput black, the carinæ red; legs except coxæ rufescent, middle tibiæ basally and apically white, front metatarsi, middle and hind tarsi except apex flavous. Stigma and nervures rufescent; femoral teeth concolorous with femora.

Length, 7 millimeters; abdomen, 4.5; petiole, 2; terebra, 10.

MINDANAO, Iligan (*Baker*).

Characterized by the short occiput and pronotum, simple posterior margin of head, inflated femora, smooth metapleuræ, and by the color of the legs.

DIASTEPHANUS LUCIFER sp. nov., female.

Female.—Frons, vertex, and occiput very finely subgranulately transstriate, vertex laterally indistinctly punctate, occiput basally narrowly smooth, posterior margin of head bordered, all tubercles small and rounded, carinæ on vertex indistinct; scape as long as cheeks, basal flagellar joints short, second little longer than first, third shorter than first and second together; neck rather long, pronotum finely transstriate, basally narrowly smooth; mesonotum short, slightly rugose, with a central impression only; central lobe of scutellum smooth and shining, the lateral lobes finely punctate and dull; mesopleuræ smooth and shining, metapleuræ coarsely, diffusely punctate, separated by a carina from the superficially reticulate punctate median segment; petiole extremely finely transstriate, shorter than the remaining smooth shining segments; terebra rufescent, as long as body. Hind coxæ cylindrical, basally irregularly rugose, apically transstriate, slightly longer than the finely transaciculate, tridentate femora, tibiæ longer than femora, the basal two-thirds compressed and transaciculate, metatarsi twice as long as the remaining joints. Radius emitted from near apex of stigma, its distal section half as long again as the proximal.

Black; face, frons, and four basal antennal joints testaceous, rest of head more rufotestaceous, prothorax beneath and anterior

legs rufotestaceous, femora darker, middle and hind metatarsi white; nervures black. Femoral teeth concolorous with femora.

Length, 8 millimeters; abdomen, 5; petiole, 2; terebra, 8.

BORNEO, Sandakan (*Baker*).

Characterized by the sculpture of the head and hind legs, and by the cylindrical hind coxæ. The whole insect very bright, excepting lateral lobes of scutellum.

DIASTEPHANUS ELONGATUS sp. nov., male.

Male.—Frons granulate rugose, vertex and occiput finely transstriate, latter with fine longitudinal impression, posterior margin of head very finely bordered, posterior tubercles small but distinct; scape as long as cheeks, second flagellar joint fully twice as long as first, third not quite as long as first and second together; neck elongate, transstriate, semiannular basally smooth; mesonotum transrugose with central impression only indicated; scutellum centrally smooth with fine marginal punctures, lateral lobes punctate; mesopleuræ smooth; metapleuræ and median segment confluent, cribrate punctate; petiole very finely transstriate, longer than the remaining smooth segments. Hind coxæ transstriate, strongly clavate, slightly longer than the tridentate femora, trochanters elongate, tibiæ not much longer than femora, compressed to beyond middle, metatarsi scarcely longer than the remaining joints. Radius emitted from apical fourth of stigma, both sections about equal in length.

Black; head beneath, mandibles basally, face, frons apically and scape rufotestaceous, remainder of head black, basal flagellar joints rufous; legs rufescent, anterior tibiæ paler; femoral teeth concolorous with femora.

Length, 12 millimeters; abdomen, 8; petiole, 4.75.

BORNEO, Sandakan (*Baker*).

DIASTEPHANUS LONGIOR sp. nov., male.

Male.—Frons coarsely arcuate striate, vertex and occiput finely and closely transstriate, posterior margin of head bordered, ocellar space striate, two inconspicuous carinæ behind posterior ocelli, all tubercles distinct; scape fully as long as cheeks, twice as long as first flagellar joint, second twice as long as first, third as long as first and second together; neck long and slender, extremely finely transstriate, appearing almost smooth, semiannular smooth and shining; mesonotum nearly smooth, with central impression only; scutellum and mesopleuræ smooth and shining; metapleuræ and median segment confluent, cribrate punctate; petiole finely transstriate, slightly longer than the re-

maining smooth shining segments, abdomen elongate, especially second segment. Hind coxæ finely transstriate, apically clavate, longer than the smooth tridentate femora, tibiæ little longer than femora, compressed about to middle. Radius emitted from apical fourth of stigma, its distal section little longer than the proximal.

Black; frons apically flavous, outer orbits white, two or three basal antennal joints rufous, anterior legs rufotestaceous, femora dorsally darker, hind legs rufescent, femoral teeth concolorous with the femora.

Length, 10 millimeters; abdomen, 6.5; petiole, 3.5.

MINDANAO, Davao (*Baker*).

Resembles my *D. elongatus*, but the neck is longer and slenderer, as is also the abdomen, especially the second segment, and the sculpture of the mesonotum and shape of hind coxæ differ greatly.

DIASTEPHANUS LEVIS sp. nov., female.

Female.—Frons, vertex, and occiput finely transstriate, latter basally almost smooth, posterior margin of head bordered, two indistinct carinæ between posterior ocelli, posterior tubercles broad; scape shorter than cheeks, antennæ normal; neck elongate, finely transstriate, semiannular smooth; mesonotum short, indistinctly rugose punctate, central impression basally distinct, the lateral ones obsolete; scutellum smooth, with a few punctures; mesopleuræ smooth and shining, basally transaciculate; metapleuræ and median segment confluent, superficially and rather irregularly reticulate punctate; petiole finely transstriate, as long as the remaining smooth segments; terebra as long as body, white-banded. Hind coxæ finely transstriate, apically almost smooth, longer than the bidentate, finely transaciculate femora, tibiæ much longer than femora, compressed to beyond middle, metatarsi rather more than twice as long as the remaining joints. Radius emitted from apical fifth of stigma, its distal section one and a half times as long as the proximal.

Dark red; fourth abdominal segment black; head, three basal antennal joints, anterior legs, hind coxæ, and abdomen apically beneath rufotestaceous, hind legs darker; middle metatarsi, the second joint, and the femoral teeth white. Stigma and nervures red-brown.

Length, 10 millimeters; abdomen, 6; petiole, 3; terebra, 10; band, 1.5; apex, 0.75.

MINDANAO, Dapitan (*Baker*).

Characterized chiefly by the fine sculpture, banded terebra, and rufoflavous hind tarsi.

DIASTEPHANUS PUNCTINOTUM sp. nov., female.

Female.—Frons basally arcuately, apically transversely striate, vertex and occiput very finely transstriate, posterior margin of head bordered, all tubercles well developed, one carina between posterior ocelli; scape shorter than cheeks, inflated, second flagellar joint not much longer than first, third longer than first and second together; pronotum finely transstriate, basally narrowly smooth; mesonotum centrally coarsely, almost reticulate punctate, laterally rugose, longitudinal rows of punctures wanting; scutellum and mesopleuræ smooth, rather dull; metapleuræ and median segment confluent, reticulate punctate; petiole extremely finely transstriate, much shorter than the remaining smooth, rather dull segments; terebra about as long as body, black. Hind coxæ transstriate, femora smooth, bidentate, tibiæ little longer than femora, compressed to far beyond middle; metatarsi three times as long as the remaining joints. Radius emitted from apical fifth of stigma, its distal section one and a half times as long as the proximal.

Black; head, three or four basal antennal joints, and anterior legs rufotestaceous, front femora darker above; middle metatarsi basally whitish, hind femora and tibiæ slightly rufescent, their tarsi red; the femoral teeth white. Stigma and nervures red-brown.

MINDANAO, Zamboanga (*Baker*).

This species is especially distinguished by the sculpture of the mesonotum.

DIASTEPHANUS CLAVICOXIS sp. nov., female.

Female.—Frons, vertex, and occiput finely and evenly transstriate, latter basally smooth, ocellar space obliquely striate, no stronger carinæ behind posterior ocelli, posterior tubercles distinct, posterior margin of head bordered; pronotum smooth, neck somewhat elongate; mesonotum rugose, with central impression only, the others obsolete; scutellum smooth; mesopleuræ smooth and shining; metapleuræ and median segment confluent, rather coarsely punctate; petiole evenly transstriate, as long as the remaining shining segments, second basally slightly rugose; terebra shorter than body, rufescent. Hind coxæ clavate, finely and evenly transstriate, as long as the bidentate femora, tibiæ not much longer than femora, compressed to beyond middle,

femora and tibiæ transaciculate, metatarsus rather more than twice as long as the remaining joints. Radius emitted from apical fourth of the long narrow stigma, its distal section about one and a half times as long as the proximal.

Black; head dark red, frons rufescent, anterior legs light red, hind femora nigrescent, their tibiæ rufescent; middle metatarsi basally, hind femoral teeth, and hypopygium white; hind tarsi rufescent.

Length, 12 millimeters; abdomen, 7; petiole, 3.5; terebra, 10.

MINDANAO, Kolambugan (*Baker*).

Differs from *D. levis* mainly in the shape of the hind coxæ and the rufescent terebra.

DIASTEPHANUS ALBIDENS Kieffer, female.

Diastephanus albidens KIEFFER, Philip. Journ. Sci. § D 11 (1916) 407, female.

The difference between this species and my *D. flavonotatus* appears to consist chiefly in the bordered posterior margin of head, sculpture of occiput, and proportions of basal antennal joints.

DIASTEPHANUS ALBONOTATUS Elliott.

Diastephanus albonotatus ELLIOTT, Philip. Journ. Sci. 29 (1926) 526, female.

This is another of the closely allied group, differing chiefly in the proportions of the antennal joints, posterior border of head, sculpture of the median segment, and color of the abdomen. The present species has pale markings on several segments, in addition to the conspicuous white spot on third.

Length, 7 millimeters; abdomen, 4; petiole, 2; terebra, 5; band, 0.75.

MINDANAO, Dapitan. SAMAR. PANAY, northwestern part (*Baker*).

DIASTEPHANUS FLAVONOTATUS Elliott, female and male.

Diastephanus flavonotatus ELLIOTT, Entom. 52 (1919); Proc. Zool. Soc. London (1922) 826, male; G. CABALLOS, "Eos," Revista Espagnola de Entomologia 2: 146, female and male.

The female agrees in all essentials with the male, but the median segment is more lightly sculptured; the terebra is shorter than the body, white-banded.

Female, length, 6.5 to 11 millimeters; abdomen, 4.5 to 6.5; petiole, 2 to 3; terebra, 4 to 6; band, 1 to 2. Male, length, 7.5 to 10 millimeters; abdomen, 4 to 6.5; petiole, 2 to 3.

BORNEO, Sandakan. LUZON, Mount Maquiling. MINDANAO, Iligan, Kolambugan, Dapitan, Davao. SAMAR. SIBUYAN. PANAY, northwestern part. NEGROS, Cuernos Mountains (*Baker*).

DIASTEPHANUS LEUCODONTUS Schletterer, female and male.

Diastephanus leucodontus SCHLETTERER, Berl. Ent. Zeit. **33** (1889) 121; ENDERLEIN, Zool. Anz. **33** (1905) 475; ELLIOTT, Proc. Zool. Soc. London (1922) 819, female.

Female.—Frons and vertex more or less distinctly transrugose, occiput very short, transstriate, basally more finely, anterior tubercle wanting, three costæ behind posterior ocelli, ocellar space oblique striate, posterior margin of head simple; cheeks longer than scape, second flagellar joint half as long again as first, third rather longer than first and second together; neck elongate, finely transaciculate or almost smooth, semiannular subnitidulous; mesonotum short, with central line of punctures only, laterally rugose; scutellum smooth; mesopleuræ smooth above, finely and diffusely punctate beneath; metapleuræ more or less coarsely punctate, separated by a carina from the median segment, which is centrally smooth, laterally punctate, apically more closely; petiole finely transstriate, varies from slightly shorter to slightly longer than the remaining segments—as long in the type, shorter in specimens from Sandakan, longer in some from Kolambugan—second segment basally slightly rugose; terebra shorter than body, white-banded, the proportions of the band and the black apex vary. Hind coxæ finely and evenly transstriate, as long as the smooth, bidentate femora, their tibiæ compressed in basal two-thirds, metatarsi twice as long as the remaining joints. Radius emitted from apical fifth of stigma, its distal section twice as long as the proximal.

Black; head rufotestaceous to red, vertex darker, with a black central streak, or vertex and occiput black; pronotum sometimes brownish or rufescent; anterior legs rufotestaceous, femora and apical half of tibiæ darker; middle tibiæ sometimes basally whitish, their metatarsi basally and the hind ones entirely white; hind femoral teeth white, hypopygium yellowish; in the smallest specimens the abdomen is more or less rufescent. Stigma and nervures rufescent.

Length, 7 to 11 millimeters; abdomen, 4 to 6.5; petiole, 2 to 3; terebra, 5 to 9; band, 0.5 to 2.5.

BORNEO, Sarawak (*Schletterer*); Sandakan. MINDANAO, Kolambugan (*Baker*).

Male.—The male was not known to Schletterer. It agrees structurally with the female. The neck entirely smooth, the metapleuræ and median segment more reticulate punctate. In color it agrees with the female from the same locality.

Black; head rufotestaceous, frons redder, vertex red, occiput black; pronotum red, petiole and third segment rufescent; anterior legs rufotestaceous, middle tibiæ and metatarsi whitish, hind legs rufescent, their tarsi pale.

Length, 7 millimeters; abdomen, 4; petiole, 2.

MINDANAO, Kolambugan (*Baker*).

DIASTEPHANUS PARVULUS sp. nov., female.

Female.—Frons, vertex, and occiput extremely finely transstriate, frons rather elongate, two carinæ between posterior ocelli, posterior margin of head bordered, all tubercles distinct; scape as long as cheeks, second flagellar joint little longer than first, third shorter than first and second together; neck very finely transstriate, basally narrowly smooth; mesonotum short, rugose, the longitudinal rows of punctures indistinct; scutellum and mesopleuræ smooth; metapleuræ reticulate punctate, separated by a carina from the superficially, rather irregularly punctate median segment; petiole transstriate, shorter than the remaining smooth shining segments; terebra shorter than body, rufescent. Hind coxæ transstriate, as long as the smooth, bidentate femora, tibiæ as long as the femora and trochanters together, compressed slightly beyond middle, metatarsi twice as long as the remaining joints. Radius emitted from near apex of stigma, its distal section twice as long as the proximal.

Black; head and three basal antennal joints, pronotum beneath rufotestaceous, outer orbits flavescent, occiput, pronotum above, and abdomen from second segment more or less rufescent; anterior legs rufotestaceous, middle metatarsi basally and hind ones entirely white; femoral teeth concolorous with femora. Wings strongly iridescent, stigma and nervures red-brown.

Length, 6.5 millimeters; abdomen, 4; petiole, 1.5; terebra, 5.5.

BORNEO, Sandakan (*Baker*).

The whole sculpture is extremely fine.

DIASTEPHANUS SEMIGLABER sp. nov., female.

Female.—Frons, vertex, and occiput extremely finely transstriate, posterior margin of head not bordered, two carinæ between posterior ocelli, posterior tubercles subobsolete, ocellar space oblique striate; scape slightly longer than cheeks, antennæ

normal; neck elongate and slender, apically foveate, then feebly transstriate, remainder of pronotum smooth and shining; mesonotum extremely short, apically punctate, scutellum smooth; mesopleuræ large, smooth, shining, very lightly punctate beneath; metapleuræ coarsely punctate, confluent with the reticulate punctate median segment; petiole very finely transstriate, as long as the remaining smooth segments; terebra slightly longer than body, white-banded. Hind coxæ very finely and evenly transstriate, as long as the bidentate, microscopically sculptured femora, tibiæ not much longer than femora, finely transaciculate, compressed to middle, metatarsi one and a half times as long as the remaining joints. Radius emitted from apical fourth of stigma, its distal section little longer than the proximal.

Rufescent; mesonotum and scutellum black; head and base of antennæ red, vertex and occiput nigrescent, anterior legs rufous, middle tibiæ and tarsi both basally white, hind legs entirely dark rufescent. Wings hyaline, stigma and nervures black-brown.

Length, 9 to 11 millimeters; abdomen, 5.5 to 7; petiole, 2.5 to 3.5; terebra, 9 to 12; band, 2 to 3; apex, 0.75.

BORNEO, Sandakan (*Baker*).

In the smaller specimen the frons more finely subtransversely shagreened, the posterior tubercles still less developed, and the general color somewhat darker.

DIASTEPHANUS CLAVATUS sp. nov., male.

Male.—Frons, vertex, and occiput finely arcuate striate, posterior margin of head bordered, two carinæ between posterior ocelli, ocellar space oblique striate, all tubercles well developed; scape as long as cheeks, antennæ normal; neck elongate, basally finely transstriate, remainder of pronotum smooth and shining; mesonotum long with a few punctures, only the central impression basally indicated; scutellum and mesopleuræ smooth and shining, metapleuræ and median segment confluent, cribrate punctate; petiole very finely transstriate, longer than the remaining smooth segments. Hind coxæ apically very strongly clavate, basally transstriate, apically transaciculate, longer than the bidentate femora, which are dull and transaciculate, as are also the tibiæ, which are compressed in basal two-thirds, metatarsi slightly longer than the remaining joints. Radius emitted from apical fifth of the long, narrow stigma, its distal section twice as long as the proximal.

Black; head rufescent, frons apically, outer orbits, scape, and first flagellar joint flavescent; hind legs rufescent, anterior legs lighter, middle metatarsi basally white; femoral teeth red.

Length, 7.5 to 9 millimeters; abdomen, 4.5 to 5.5; petiole, 2.5 to 3.

MINDANAO, Kolambugan. BORNEO, Sandakan (*Baker*).

These specimens bear a strong resemblance to my *D. clavicoxis*. The hind coxæ are even more strongly clavate, the petiole and the distal section of radius are proportionally longer but, above all, the femoral teeth are concolorous with the femora, which makes it impossible to unite the species, as such difference between the sexes is not known to exist.

DIASTEPHANUS COSTIFRONS sp. nov., female.

Female.—The frons is costate rather than striate; the inner costæ extend into the ocellar space on each side of the ocellus, the others follow the lower curve, ending against the eyes; vertex and occiput finely transstriate, posterior margin of head extremely finely bordered, one strong carina between posterior ocelli, posterior tubercles small, broad, and inconspicuous; scape as long as cheeks, antennæ normal; neck somewhat elongate, evenly transstriate, as is also the apical half of the semiannular; mesonotum irregularly rugose, no trace of the usual longitudinal impressions; central lobe of scutellum smooth and shining, the lateral lobes dull, with microscopic sculpture; mesopleuræ smooth and shining, metapleuræ coarsely punctate, confluent with the reticulate punctate median segment; petiole finely transstriate, as long as the remaining smooth, rather dull segments; terebra rufescent, shorter than body. Hind coxæ transstriate, subclavate, about as long as the smooth bidentate femora, tibiæ longer than femora, compressed to beyond middle, metatarsi three times as long as the remaining joints. Radius emitted from apical fifth of stigma, its distal section twice as long as the proximal.

Black; head rufotestaceous, vertex and occiput red, legs rufescent, middle tibiæ and metatarsi basally white, hind tarsi red.

Length, 10 millimeters; abdomen, 6; petiole, 3; terebra, 8.

BORNEO, Sandakan (*Baker*).

The structure of the frons appears to be unique, and contrasts strongly with the fine striation of the vertex and occiput.

NEW MUSCOIDEA FROM THE PHILIPPINES REGION

By Charles H. Tyler-Townsend

Of the Instituto de Parasitologia Agricola, Lima, Peru

This paper presents some of the results of a study of material sent me by the late Prof. Charles F. Baker.

Genus UROEUANTHA novum

Genotype, *Uroeuantha longipes* sp. nov., Kolambugan, Mindanao.

Differs from *Minthomyia* as follows: Frontal profile at least $1\frac{1}{3}$ times facial profile; clypeus nearly flush, depressed next facialia, subequilateral, length of clypeus nearly 3 times clypeal width; palpi short, stout-cylindric, bowed, not thickened at tip in male; base of antennæ rather below eye middle; male width of vertex hardly over $\frac{1}{11}$ head width, front equilateral on hind $\frac{2}{3}$ and then widening to $\frac{1}{5}$ head width at base of antennæ; 2 hairlike verticals in male, inner verticals convergent; no reclinate frontoörbitals in male; frontalia in male linelike, visible only on forward half, parafrontalia approximated over frontalia and meeting on posterior half; 3 pairs proclinate ocellars, curved, not divaricate; parafacialia narrow, nearly equilateral, not quite as wide as facialia reversed; cheeks hardly over $\frac{1}{10}$ eye length; 1 sternopleural, 3 postsutural dorsocentrals, 3 preacrostichals but only middle one strong, no postacrostichals, 2 lateral scutellars, apical pair of scutellar bristles decussate and shorter than basal lateral scutellars, no discal scutellars; 1 bristle at base of fifth radial or third vein; fifth radial or apical cell widely open well before wing tip; third medial or hind cross vein nearer cubitulus and nearly its length therefrom, long; male front legs and hind legs extraordinarily long, very slender, tarsi extremely elongate (middle legs missing); front metatarsi equal to front tibiæ, hind metatarsi equal to next joint of tarsi; male fourth apparent or fifth actual abdominal segment caudate, tail as long as rest of segment; scattered long discal and terminal bristles below and on sides and tip of fourth apparent or fifth actual

abdominal segment, but only short bristles above like hairs of rest of abdomen.

UROEUANTHA LONGIPES sp. nov.

Length of body, 12 millimeters; length of wing, 11; 1 male, Kolambugan, Mindanao, No. 23236 (*Baker*).

Head silvery, frontalia brown, palpi very pale testaceous; plr silvery, mesoscutum silvery with a faint yellowish tinge; 4 black thoracic vittæ, inner pair of thoracic vittæ linelike before transverse suture but lost behind transverse suture in wide median black area that does not reach hind margin of postscutum and narrows some posteriorly; scutellum blackish brown, silvery on tip; abdomen yellow, with extreme base above, median vitta above and below, hind edge of second apparent or third actual abdominal segment and all of last 2 abdominal segments except front fourth of third apparent or fourth actual abdominal segment brownish black, basal fourth of last 2 abdominal segments silvery; legs dark brown, coxæ silvery; wings faintly yellowish smoky, costa stigma to wing tip slightly more marked; squamæ translucent, with straw-colored edge.

Genus URODEXIOMIMA novum

Genotype, *Urodexiomima uramyoides* sp. nov., Los Baños.

Differs from *Pseudodexia* as follows: Frontal profile rather flattened, but little arcuate, $1\frac{1}{2}$ times facial profile; clypeus nearly flush, narrow, length of clypeus over twice clypeal width; facialia bare, flattened-cordlike; vibrissal axis some less than antennal axis, latter quite $\frac{3}{4}$ head height; palpi long, slender, subcylindric, scarcely thickened at tip in male, a little thicker on distal third; base of antennæ rather below eye middle; male, third antennal joint 3 times second antennal joint, narrow, rounded at tip; arista short, scarcely longer than third antennal joint, thinly long-plumose to tip; male, width of vertex $\frac{1}{5}$ head width, front equilateral on hind half and then widening to $\frac{1}{3}$ head width at base of antennæ; verticals 1 in male; parafacialia bare, strongly narrowed below, as wide above as clypeal width; cheeks probably about $\frac{1}{5}$ eye length (shrunken); 2 postintraalars and postacrostichals, 2 long lateral scutellars, long decussate apical scutellars, 1 moderately strong discal scutellar; first radial or first vein terminating very far beyond sixth radial or small cross vein, with 1 bristle at tip on one side; fifth radial or apical cell narrowly open moderately before wing tip; third medial or hind cross vein sinuate, $\frac{3}{4}$ its length from cubitulus; squamæ

rather large, strongly widened behind, the subangular inner hind corner of squamæ produced inward; 1 median marginal on first apparent or second actual abdominal segment.

URODEXIOMIMA URAMYOIDES sp. nov.

Length of body, 8.5 millimeters; length of wing, 7.5; 1 male, Los Baños, Luzon (*Baker*).

Head tawny silvery; frontalia and antennæ reddish fulvous, third antennal joint largely brown; palpi fulvous; plr and mesoscutum grayish silvery; 4 thoracic vittæ, outer pair of thoracic vittæ very broad and interrupted at transverse suture, inner pair of thoracic vittæ narrow before transverse suture, all 4 subconfluent behind transverse suture in a large rich brown subrectangular marking showing some golden pollen; scutellum brown on base, pollinose on tip and hind margin; abdomen fulvous yellow, with median vitta, basal or first actual abdominal segment, hind third of first apparent or second actual abdominal segment, hind $\frac{2}{3}$ second apparent or third actual abdominal segment, hind half of third apparent or fourth actual abdominal segment, and angular tip of fourth apparent or fifth actual abdominal segment brown; bases of intermediate segments narrowly silvery, nearly basal $\frac{3}{4}$ of fourth apparent or fifth actual abdominal segment silvery; coxæ and femora fulvous, tibiæ little darker, tarsi blackish; wings nearly clear, squamæ glassy whitish.

Genus SISYROPODODEXIA novum

Genotype, *Sisyropododexia luteicornis* sp. nov., Mindanao.

Differs from *Spathidexia* as follows: Palpi length of haustellum, bowed, wide throughout; male third antennal joint 3 times second antennal joint, narrow, equilateral, rounded at tip; arista longer than antennæ, short-plumose halfway; eyes very large and long, not oblique, reaching far below oral margin level; male verticals $\frac{1}{5}$ head width, front only faintly widening to less than $\frac{1}{3}$ head width at base of antennæ; frontals stopping at base of antennæ, 4 or 5 in number; 2 verticals in male; 3 proclinate frontoörbitals in male, set in middle of width and on hind half of length of parafrontalia; 1 reclinate frontoörbital in male, set inside and in advance of hind proclinate frontoörbitals; cheeks about $\frac{1}{15}$ eye length; 2 postintraalars and preacrostichals; no costal spine; fifth radial or third vein bristled $\frac{1}{3}$ to halfway to sixth radial or small cross vein; fifth radial or apical cell open a little before wing tip; third medial or hind cross vein sinuate,

not its length from cubitulus; all metatarsi exceeding following joints.

SISYROPODODEXIA LUTEICORNIS sp. nov.

Length of body, 10 to 11 millimeters; length of wing, 9; 3 males, Surigao and Dapitan, Mindanao, and Sibuyan (*Baker*).

Yellowish ground color; head silvery white; vertex and parafrontalia golden on inner edge and above; frontalia dark brown, antennæ bright yellow, palpi pale straw color; plr silvery, mesoscutum golden; 4 blackish thoracic vittæ, inner pair of thoracic vittæ narrow; scutellum pale yellowish or fulvous, light golden pollinose; abdomen fulvous yellow, with basal depression, median vitta and hind borders last 2 abdominal segments blackish; narrow base first 2 abdominal segments and basal half of fourth apparent or fifth actual abdominal segment silvery; legs yellow, tarsi and hind tibiæ black; wings yellowish on costa and wing veins; squamæ yellowish.

Genus PHILIPPOFORMOSIA novum

Genotype, *Philippoformosia splendida* sp. nov., Nueva Vizcaya.

Differs from *Tutilodexia* as follows: Facial carina not canaliculate on median line; arista micropubescent; parafacialia hairy; cheeks fully $\frac{3}{4}$ eye length; fifth radial or apical cell widely open considerably before wing tip; hind tibiæ short-ciliate; fourth apparent or fifth actual abdominal segment with marginal row hairlike and longer than marginal row of third apparent or fourth actual abdominal segment.

PHILIPPOFORMOSIA SPLENDIDA sp. nov.

Length of body, 13 millimeters; length of wing, 14; 1 female, Imugan, Nueva Vizcaya (*Baker*).

Head metallic bluish green, frontalia dark brown; antennæ, clypeus, epistoma, facialia, palpi, and cheek grooves brownish testaceous; plr blackish green; mesoscutum bright green, with golden reflections; 4 violet cupreous thoracic vittæ, inner pair of thoracic vittæ black and narrow before transverse suture, all violaceous and subconfluent behind transverse suture, scutellum cupreous violet, narrow margin blackish green; abdomen golden green with some bright cupreous reflections; first apparent or second actual abdominal segment, median line and hind half of intermediate segments dark chocolate brown, venter showing green on front parts of first apparent or second actual abdominal segment; legs blackish; wings lightly tinged with yellowish

smoky, darker on wing veins, blackish on basal cells and first subcostal or humeral cross vein; squamæ pale smoky brown.

Genus EPSEUDOCYPTERA novum

Genotype, *Epseudocyptera epalpata* sp. nov., Mindanao.

Differs from Brauer and Bergenstamm's description of *Pseudocyptera* as follows: Palpi absent; female width of vertex $\frac{1}{4}$ head width, front widening to fully $\frac{2}{5}$ head width at base of antennæ; wings nearly clear; abdomen very long-oval, wider end forward; 2 sternopleurals, being the front ones, hind absent; 3 postsutural dorsocentrals, 2 postintraalars, 3 very short preacrostichals; 3 postracrostichals, 2 front ones short; 2 lateral scutellars, strong decussate apical pair of scutellar bristles, 1 very small hairlike discal scutellar; cheeks nearly $\frac{1}{3}$ eye length; epistoma cut off just above vibrissal level, full width, strongly and suddenly warped; frontals 5, stopping at front edge of base of antennæ.

EPSEUDOCYPTERA EPALPATA sp. nov.

Length of body, 10 millimeters; length of wing, 7.5; 1 female, Davao, Mindanao (*Baker*).

Head silvery, frontalia brown; first antennal joint and basal half of second antennal joint brown, rest of second antennal joint subrufous, third antennal joint subfulvous; plr, mesoscutum, and scutellum silvery; 4 black thoracic vittæ, inner pair of thoracic vittæ narrower; abdomen black, intermediate segments widely silvery on bases; legs black, tibiæ subfulvous on distal half; wings faintly yellowish on costa, subfulvous on wing base, faintly blackish at wing tip; squamæ watery whitish.

Genus PALPOCYPTERA novum

Genotype, *Palpocyptera pulchra* sp. nov., Mindanao.

Differs from *Ocypteropsis* as follows: Frontal profile not over $\frac{2}{3}$ facial profile, flat, but little sloped; clypeus flush, arched on median line, length of clypeus $1\frac{1}{2}$ times clypeal width; epistoma cut short, full width, well warped; vibrissal axis equal to antennal axis, latter nearly $\frac{2}{5}$ head height; proboscis (retracted) apparently short but slender and corneous, labella rather small; female width of vertex $\frac{3}{13}$ head width, front widening gradually, face in middle little over $\frac{1}{2}$ head width; 1 long strong vertical in female; frontalia gently narrowed behind, width of frontalia little over $1\frac{1}{2}$ times width of parafrontal in middle in female;

parafacialia bare, narrow, long, nearly equilateral, little wider than widest part of facialia; 3 preacrostichals; 4 postacrostichals, front 2 weaker; 1 discal scutellar, shorter than the decussate apical scutellars; fifth radial or apical cell petiolate well before wing tip, stalk shorter than sixth radial or small cross vein; third medial or hind cross vein strongly sinuate, $\frac{2}{3}$ its length from cubitulus; marginal row on third apparent or fourth actual abdominal segment.

PALPOCYPTERA PULCHRA sp. nov.

Length of body, 16.5 millimeters; length of wing, 13; 1 female, Surigao, Mindanao (*Baker*).

Shining black; head light golden pollinose, changing in oblique view to rust brown; frontalia velvety dark brown; parafrontalia shining dark brown on over hind half; palpi dark brown, tips paler; occiput gray, occipital beard pale brassy; plr, mesoscutum, and scutellum thinly silvery; 4 black thoracic vittæ, inner pair of thoracic vittæ linelike; basal third of second apparent or third actual abdominal segment and nearly basal half of third apparent or fourth actual abdominal segment deep golden pollinose; coxæ and femora pale golden pollinose on outside; tibiæ rufous except base; wings well suffused with yellow, wing veins darker; squamæ nearly concolorous, more or less glassy.

Genus OPSOCYPTERA novum

Genotype, *Opsocyptera optima* sp. nov., Mindanao.

Differs from *Ocypterula* as follows: Clypeus flush, narrow, long, equilateral, length of clypeus fully $2\frac{1}{2}$ times clypeal width; epistoma full width, strongly warped, length of epistoma nearly $\frac{1}{2}$ width of epistoma; vibrissal axis exceeding antennal axis, latter nearly head height; eyes bare, long, oblique, reaching rather below oral margin level and well below vibrissal level; female, width of vertex scarcely $\frac{1}{3}$ head width, front widening gently to over $\frac{1}{3}$ head width at base of antennæ; frontals 5 or 6, small, stopping even with frontalia and closely approximated to same; 2 proclinate frontoörbitals in female, hind one very short and weak like frontals; 1 weak reclinate frontoörbital in female; ocellars 1, weak, proclinate, and 1, weak, divaricate behind ocelli, also occipitocentrals behind latter; parafacialia bare, equilateral, width of parafacial a little less than clypeal width; cheeks $\frac{1}{4}$ eye length; 2 sternopleurals; 2 lateral scutellars, both long and equal; strong decussate apical pair of

scutellar bristles, shorter than lateral scutellars; first medial or apical cross vein strongly sinuate; short stump of vein at cubitulus; female abdomen long and narrow, equilateral, length of abdomen over twice length of thorax, 5 abdominal segments seen from above but first very short; fourth apparent or fifth actual abdominal segment with marginal row of 6 but median marginal pair set so far forward as to appear discal.

OPSOCYPTERA OPTIMA sp. nov.

Length of body, 8 to 9 millimeters; length of wing, 6 to 6.75; 2 females, Dapitan and Kolambugan, Mindanao, No. 23258 (*Baker*).

Head silvery, parafrontalia faintly brassy; frontalia dark brown, antennæ blackish; plr silvery between leg grooves; mesoscutum thinly sivery, with very faint brassy tinge; 4 thoracic vittæ dark, outer pair of thoracic vittæ heavy, inner pair of thoracic vittæ very delicate and linelike; scutellum thinly silvery; abdomen rufous, with extreme base, median vitta on base, hypopygium, fourth apparent or fifth actual abdominal segment and irregular hind half of third apparent or fourth actual abdominal segment black; second apparent or third actual abdominal segment narrowly silvery on base, third apparent or fourth actual abdominal segment silvery more or less on basal two-thirds; legs black; wings yellow on broad costobasal portion, blackish on rest of wing-vein region but with light areas in fifth radial or apical cell and discal cell, wide irregular inner border nearly clear; squamæ whitish, edges narrowly tawny.

Genus ZAMBESOIDES novum

Genotype, *Zambesoides samarensis* sp. nov., Samar.

Differs from *Zambesa* as follows: Head wider than high, vertex well depressed below top level of eyes; vibrissal axis equal to antennal axis, latter $\frac{2}{3}$ head height; second antennal joint elongate, third antennal joint in female hardly 3 times second antennal joint; eyes bare, oblique, reaching nearly to vibrissal level; female width of vertex hardly over $\frac{1}{7}$ head width, front widening very gradually to scarcely $\frac{1}{4}$ head width at base of antennæ; face in middle little over $\frac{1}{3}$ head width; verticals 1 in female, decussate; 1 strong proclinate frontoörbital in female; frontalia gently narrowed behind, width of frontalia equal to width of parafrontal in middle; no preacrostichals, 1 weak postacrostichal; apical pair of scutellar bristles decussate, equal

to basal lateral scutellars; sixth radial or small cross vein normal, first radial or first vein terminating opposite same; fifth radial or apical cell open twice mouth width of fifth radial or apical cell before wing tip, tip of cell elongate and narrow; cubitulus rounded obtuse angled, $\frac{1}{3}$ width of wing from hind margin of wing; first medial or apical cross vein arcuate inward; no median discals on any abdominal segments.

ZAMBESOIDES SAMARENSIS sp. nov.

Length of body, 11 millimeters; length of wing, 9; 1 female, Samar (*Baker*).

Head silvery, parafrontalia more leaden silvery; frontalia dark brown; antennæ black, third antennal joint dark brown shading to subrufous on inner proximal half; palpi blackish; plr silvery, mesoscutum more leaden silvery; 4 blackish thoracic vittæ, inner pair of thoracic vittæ delicately linelike; scutellum black, faintly silvery; abdomen black, bases of intermediate segments and all of fourth apparent or fifth actual abdominal segment silvery, ventral triangles of silvery on first apparent or second actual abdominal segment and second apparent or third actual abdominal segment, whole venter of third apparent or fourth actual abdominal segment silvery; legs blackish, proximal $\frac{3}{4}$ of femora largely pale fulvous; wings faintly smoky, slightly darker on costa from stigma to wing tip; squamæ glassy, narrow edges opaque straw color.

Genus ANDROCYPTERA novum

Genotype, *Androcyptera anorbitalis* sp. nov., Baguio.

Differs from *Ichneumonops* as follows: Clypeus flush, length of clypeus twice clypeal width; vibrissæ long, decussate, removed from oral margin at least laterally; third antennal joint $1\frac{1}{2}$ times second antennal joint, narrow, rounded at tip; width of vertex, male and female, over $\frac{1}{4}$ head width, front widening gently in female to $\frac{1}{3}$ and in male to over $\frac{1}{3}$ head width at base of antennæ; no proclinate frontoörbitals nor reclinate frontoörbitals, male and female; cheeks scarcely $\frac{1}{4}$ eye length; 1 lateral scutellar; apical pair of scutellar bristles strong, decussate, not as long as lateral scutellars; fifth radial or apical cell long-petiolate far before wing tip, stalk over twice sixth radial or small cross vein and strongly bent upward; cubitulus rounded right angled to faintly obtuse angled, $\frac{1}{3}$ width of wing from hind margin of wing; first medial or apical cross vein bent

in at tip to form a V with stalk of fifth radial or apical cell, in middle faintly bent in; no wrinkle at cubitulus; abdomen bottlelike, petiolate, length of abdomen twice length of thorax in male but not in female, first apparent or second actual abdominal segment strongly widened behind; 1 median marginal on first two abdominal segments, marginal row of 6 to 8 on last 2 abdominal segments.

ANDROCYPTERA ANORBITALIS sp. nov.

Length of body, 6 to 7 millimeters; length of wing, 4.5 to 6; 2 females, Baguio, Benguet, No. 5037; 2 males, Tangcolan, Bukidnon, No. 23240 (*Baker*).

Head silvery, parafrontalia faintly golden in male; frontalia and antennæ brown, base of third antennal joint lighter in female; plr and mesoscutum silvery, 2 very broad subconfluent black thoracic vittæ; scutellum and abdomen brownish black, bases of last 3 abdominal segments silvery; legs blackish, femora and coxæ silvery; wings lightly smoky in male, more dilute in female; squamæ nearly white, faintly yellowish in female at times.

Genus ALOPHOROPHASIA novum

Genotype, *Alophorophasia alata* sp. nov., Luzon.

Differs from *Xanthosyntomogaster* as follows: Epistoma long, wide, widened some below, well sprung, length of epistoma not half the length of clypeus nor equal to upper width of epistoma, latter twice width of facialia plus width of parafacial; vibrissæ strong, well differentiated; palpi stout-cylindric, length of antennæ, scarcely thickened at tip in male; second antennal joint elongate; third antennal joint in male nearly twice second antennal joint, rather narrow, rounded at tip; eyes bare, very large, not oblique, excavated behind on lower half, reaching below oral margin level but not completely hiding cheeks; frontals 11 to 12, close to frontalia, stopping at base of antennæ; parafacialia narrow, equilateral, width of parafacial $\frac{1}{3}$ clypeal width and equal to width of facialia; cheeks $\frac{1}{12}$ eye length in male; 3 sternopleurals, no preacrostichals, 1 lateral scutellar; cubitulus strongly rounded obtuse angled, $\frac{1}{7}$ width of wing from hind margin of wing; third medial or hind cross vein sinuate, not its length from cubitulus; no median discals on any abdominal segments, macrochætæ extremely short and barely differentiated; median marginals, middle legs, and lateral discals on first apparent or second actual abdominal segment.

ALOPHOROPHASIA ALATA sp. nov.

Length of body, 10 millimeters; length of wing, 8.75; 1 male, Mount Banahao, Luzon, No. 5026 (*Baker*).

Head golden; frontalia, antennæ, and palpi blackish; occiput and cheeks silvery, occipital beard whitish; plr, 2 spots on front edge of prescutum, humeri, hind margin of prescutum and hind and lateral margins of postscutum silvery; rest of mesoscutum black, thoracic vittæ not apparent, scutellum brown to blackish; abdomen fulvous yellow, shading to dusky above and below on median line and hind half; legs deep brown, trochanters and coxæ subfulvous; wings lightly yellowish smoky; squamæ translucent, faintly smoky, squamulæ more opaque and whitish.

Genus OCHROPHASIA novum

Genotype, *Ochrophasia atripennis* sp. nov., Mindanao.

Differs from *Clytiomya* as follows: Length of epistoma half length of clypeus, width of epistoma half width of facialia plus width of parafacial, epistoma gently warped; facialia very wide, flattened, bare, slightly oblique to clypeal plane, as wide below as parafacialia, width of facialia $\frac{2}{3}$ clypeal width; no differentiated vibrissæ, only short bristles of even length; palpi equal to third antennal joint, stout-clavate, bowed; female width of vertex not $\frac{1}{5}$ head width, front widening very rapidly to $\frac{2}{5}$ head width at base of antennæ; frontalia short, broad, nearly equilateral, anterior points spread, width of frontalia fully equal to width of parafrontal in middle, length of frontalia on median line from lunula to ocellar triangle little over twice width of frontalia; width of parafacial above equals clypeal width; apical scutellars parallel, short; fifth radial or apical cell open nearly in wing tip; cubitulus a rounded widely obtuse angle, scarcely $\frac{1}{4}$ width of wing from hind margin of wing; female hypopygium small, ventrocaudal aspect, telescoped, normal, egg-depositing.

OCHROPHASIA ATRIPENNIS sp. nov.

Length of body, 11 millimeters; length of wing, 9.5; 1 female, Surigao, Mindanao (*Baker*).

Head golden, more brightly so on parafrontalia; frontalia and antennæ brown; palpi pale fulvous; uocc blackish; occipital beard brassy whitish; plr golden; mesoscutum blackish, margins fulvorufous and golden pollinose; scutellum and abdomen orange ocherous, venter paler yellow; legs orange yellow, tarsi and tibiæ blackish; wings smoky black throughout, scarcely lighter on inner edge; squamæ golden yellow.

Genus OXYDEXIOPS novum

Genotype, *Oxydexiops uramyoides* sp. nov., Mindanao.

Differs from *Meigenia* as follows: Frontal profile long, flattened in female and faintly arcuate in male, strongly sloped, scarcely longer than facial profile to end of epistoma; clypeus well depressed, narrowing gently upward, length of clypeus $2\frac{1}{2}$ times clypeal width; epistoma long, full width, in clypeal plane in male and gently warped in female, length of epistoma fully half width of epistoma; vibrissæ strong, decussate, far above oral margin level; proboscis very short, stout, haustellum equals length of labella and not $\frac{1}{4}$ head height, labella very large; palpi stout, bowed, length of haustellum, widened and flattened especially in female; base of antennæ on eye middle; arista longer than whole antennæ, thickened $\frac{1}{6}$ to $\frac{1}{7}$ way, micropubescent on little more than thickened part; width of vertex, male and female, $\frac{1}{11}$ head width, front equilateral on over hind half of female and on nearly hind half of male, then widening to $\frac{1}{5}$ head width at base of antennæ in male and somewhat less in female (head shrunken in female); 2 strong proclinate frontoorbitals, male and female, close to frontals; width of frontalia half the width of parafrontal in middle in male, over half in female; cheeks $\frac{1}{6}$ eye length in male, $\frac{1}{7}$ in female; 2 sternopleurals, no discal scutellars; fifth radial or apical cell open well before wing tip; cubitulus rounded right angled to slightly obtuse angled, $\frac{1}{6}$ width of wing from hind margin of wing; first medial or apical cross vein well arcuate inward; squamæ rather long, well widened behind, inner hind corner of squamæ subangular, especially in male; legs long, in male middle legs longer than others; hind tibiæ short-ciliate on basal half or so, male and female, with a slightly stouter bristle near middle; female metatarsi equal following joints, middle metatarsi of female longer than following joints; male metatarsi not equal to following joints, middle metatarsi and tarsi of male very long.

OXYDEXIOPS URAMYOIDES sp. nov.

Length of body, 11 to 16 millimeters; length of wing, 9 to 10.5; 2 males, Butuan, Mindanao; 2 females, Davao, Mindanao, and Mount Banahao, Luzon, No. 23233 (*Baker*).

Head silvery, parafrontalia in male brassy on hind half; frontalia and antennæ blackish brown, second antennal joint and base of third antennal joint more or less rufous; palpi fulvous; plr silvery; mesoscutum silvery, faintly brassy; 4 blackish brown thoracic vittæ, inner pair of thoracic vittæ narrower, outer pair

of thoracic vittæ semicolonlike and confluent with inner pair of thoracic vittæ behind transverse suture in rectangular brown marking pronged behind on each side; scutellum dark brown on base, silvery on apical half; abdomen pale rufofulvous, female with first apparent or second actual abdominal segment, hind borders of last 3 abdominal segments and broken median vitta dark brown; male with depression of first apparent or second actual abdominal segment, narrow median vitta, broad hind borders of intermediate segments and all of fourth apparent or fifth actual abdominal segment except extreme base brown; light parts of abdomen thinly silvery pollinose and fourth apparent or fifth actual abdominal segment in male the same; legs brown, femora fulvous except tips of middle femora and hind femora; wings in female clear, in male faintly yellowish smoky on wing veins; squamæ glassy whitish, faintly tawny yellowish in male.

Genus STRONGYLONEUROPSIS novum

Genotype, *Strongyloneuropsis malayensis* sp. nov., Singapore.

Differs from *Strongyloneura* (*S. nepalana* Tyler-Townsend) as follows: Palpi flattened laterally, thin, widened apically, bristled; arista rather thinly long-plumose to tip; male, width of vertex one-ninth head width, front narrowed before ocellar triangle and then widened to over one-fourth head width at base of antennæ; female, width of vertex fully one-fifth head width, front widening gradually to one-third head width at base of antennæ; face below about half head width; parafacialia equilateral in male, narrowed some below in female, width of parafacialia equal to width of facialia; facioörbitals represented by row of setæ; third long vein bristled one-third to halfway to small cross vein; apical cell open 3 to 4 times mouth width of fifth radial or apical cell before wing tip; cubitulus a widely rounded obtuse angle, about one-fourth wing width from hind margin of wing; male hypopygium large, caudoventral, first hypopygial segment with strong erect bristles, second hypopygial segment with weaker bristles; female hypopygium large, flattened boxlike, theca broad.

STRONGYLONEUROPSIS MALAYENSIS sp. nov.

Length of body, 8.5 millimeters; length of wing, 6.5. One male and one female, Singapore (*Baker 9152*).

Head silvery cinereous, frontalia brown, palpi and antennæ fulvous yellow; thorax and abdomen metallic green, thinly silvery white; three dark brown subequal thoracic vittæ,

obsolete before transverse suture of mesoscutum in male; first apparent or second actual abdominal segment, intermediate segments of abdomen except broad front corners, median vitta and hind half or less of fourth apparent or fifth actual abdominal segment brownish black, rest of tergum green to cupreous and silvery white pollinose; legs blackish, tibiæ fainty reddish; wings yellowish on costa, except blackish cloud before wing tip; squamæ nearly white.

Genus MEDINACEMYIA novum

Genotype, *Medinacemyia sibuyana* sp. nov., Sibuyan.

Differs from *Euhalidaya* as follows: Epistoma receding below from clypeal plane, nearly as long as upper width; proboscis stublike, not over one-fourth head height, haustellum not much longer than wide, labella large; base of antennæ on eye middle, antennæ separated at base; arista thickened one-fifth way, micropubescent halfway; eyes pushed slightly forward below, reaching median oral margin level; male, width of vertex nearly one-third head width, front widening very gradually to over one-third head width at base of antennæ; face below three-sevenths head width and appearing subequilateral with front at base of antennæ; frontals stopping even with frontalia and hugging edge of same, 6 strong; no outer verticals or proclinate frontoörbitals in male, 2 reclinate frontoörbitals in male; frontalia in male nearly equilateral, width of frontalia rather over width of parafrontal in middle; parafacialia bare, equilateral but widened suddenly above, scarcely as wide as facialia below; male cheeks scarcely one-sixth eye length; sternopleurals 2, strong, haustellum much longer; postacrostichals 4; third long vein bristled halfway to small cross vein; 1 median discal on last three abdominal segments.

MEDINACEMYIA SIBUYANA sp. nov.

Length of body, 8.5 millimeters; length of wing, 7. One male, Sibuyan Island.

Head tawny silvery, parafrontalia deep golden; frontalia dark brown; antennæ and palpi rufofulvous; pleura tawny silvery; mesoscutum golden, hind edge and four thoracic vittæ blackish, latter blotchlike except inner pair of thoracic vittæ—when 4 or more are present—before transverse suture of mesoscutum, all confluent behind transverse suture of mesoscutum as seen from behind; scutellum blackish on basal fourth, rust brown on next fourth, golden on posterior half; abdomen fulvous, faint median vitta and irregular hind margins of

abdominal segments brownish, basal half or so of last three abdominal segments bright golden pollinose; legs blackish; wings yellowish on costa and base; squamæ pale yellowish tawny.

Genus PROPARATHELAIRA novum

Genotype, *Proparathelaira plumosa* sp. nov., Luzon.

Differs from *Parathelaira* as follows: Frontal profile somewhat arcuate; epistoma cut off short, edge at most faintly warped, facialia straight, flattened oblique to clypeal plane; female, second antennal joint short, third antennal joint nearly four times second antennal joint and equilateral; arista thickly short-plumose halfway, then thinly shorter-plumose; female, width of vertex one-fifth head width, front gradually widening to one-third head width at base of antennæ; face only faintly widening from front; 2 verticals in female, inner verticals decussate; 2 proclinate frontoörbitals in female, stronger than frontals; 1 reclinate frontoörbital equal to frontals; 3 sternopleurals, 2 postintraalars, 1 preacrostichal, 1 postacrostichal; squamæ wide behind, inner hind corner of squamæ rather angular; metatarsi equal to following joints; no median discals on last three abdominal segments.

PROPARATHELAIRA PLUMOSA sp. nov.

Length of body, 8 millimeters; length of wing, 7. One female, Mount Maquiling, Luzon.

Head silvery white, frontalia dark brown; antennæ pale fulvous yellow; palpi pale straw yellow; thorax silvery, inner edge of parafacialia and mesoscutum along median line faintly golden; four black thoracic vittæ, inner pair of thoracic vittæ—when 4 or more are present—narrow before transverse suture but coalesced behind transverse suture; abdomen translucent fulvorufous, third apparent or fourth actual abdominal segment, posterior half of second apparent or third actual abdominal segment, and median vitta blackish; last three abdominal segments narrowly silvery on base; legs fulvous yellow, tibiæ and tarsi blackish; wings lightly yellow; squamæ glassy yellow.

Genus ASBELLOPSIS novum

Genotype, *Asbellopsis luzonensis* sp. nov., Luzon.

Differs from *Sumatrodexia* as follows: Frontal profile faintly arcuate, hardly $1\frac{1}{3}$ times facial profile; latter not receding; occipital plane in vertical; epistoma cut off at vibrissal level; facialia bare; proboscis half head height; haustellum 3 times

as long as thick; female, third antennal joint 3 times second antennal joint; female, width of vertex two-fifths head width, front widening gradually to fully half head width at base of antennæ; face in middle five-sevenths head width; frontals 6 in female; 2 long proclinate frontoörbitals and 1 long divaricate reclinate frontoörbital in female; frontalia narrowed posteriorly, two-thirds width of parafrontal in middle in female; parafacialia bare, equilateral, equal to width of clypeus; no genoörbitals; 1 postacrostichal; prescutum shorter than postscutum; 4 dark thoracic vittæ; costal spine strong, longer than small cross vein; apical cell widely open hardly twice mouth width of fifth radial or apical cell before wing tip, tip curved handlelike; apical cross vein strongly bowed in; hind cross vein its length from cubitulus; squamæ rather small, a little widened behind, inner hind corner of squamæ subangular; abdomen oval in female; marginal row of 6 on second apparent or third actual abdominal segment; no median discals on fourth apparent or fifth actual abdominal segment.

ASBELLOPSIS LUZONENSIS sp. nov.

Length of body, 8.75 millimeters; length of wing, 7.75. One female, Los Baños, Luzon (*Baker 479*).

Head tawny pollinose, parafrontalia and upper occipital orbits somewhat deeper tawny; frontalia blackish brown; antennæ and palpi bright fulvous; cheek grooves reddish brown; pleura and mesoscutum cupreous to green, blue or violet in ground color, well tawny silvery pollinose; inner pair of thoracic vittæ—when 4 or more are present—narrow, outer pair of thoracic vittæ very heavy but rather even; scutellum brown, thinly pollinose; abdomen yellowish to fulvous, brown on median vitta, narrow hind margin of first apparent or second actual abdominal segment, wider hind margin of second apparent or third actual abdominal segment, nearly all of third apparent or fourth actual abdominal segment above, and sides of fourth apparent or fifth actual abdominal segment; bases of last three abdominal segments tawny silvery pollinose, more so on last two abdominal segments; legs fulvous yellowish, tibiæ more brownish, tarsi dark; wings lightly yellowish infuscate; squamæ pale tawny translucent.

Genus BARYDEXIA novum

Genotype, *Barydexia bivittata* sp. nov., Luzon.

Differs from *Calotheresia* as follows: Head width scarcely equal to head height; length of clypeus twice width of clypeus;

facial carina high, wide; length of epistoma equal to width of epistoma; vibrissæ far above oral margin level; vibrissal axis equal to antennal axis, latter three-fifths head height; palpi subcylindric, bristled, little thickened at tip; 3 sternopleurals, 2 postacrostichals; 2 heavy wide black thoracic vittæ; no median marginals on first apparent or second actual abdominal segment, no median discals on intermediate segments of abdomen.

BARYDEXIA BIVITTATA sp. nov.

Length of body, 12 to 15 millimeters; length of wing, 11.5 to 14.5. Two males, Mount Banahao, Laguna Province, and Baguio, Benguet Subprovince, Luzon.

Head and thorax very pale brassy, including scutellum; frontalia black; antennæ and facial carina pale brownish fulvous, second antennal joint at times brown; palpi brown, paler on tip; thoracic vittæ equilateral, very wide, coalesced behind in black horseshoe following edge of postscutum from wing base to wing base and including base of scutellum; abdomen fulvous yellow, median vitta and hind border of last 3 abdominal segments dark brown; clypeus and fourth apparent or fifth actual abdominal segment silvery pollinose; legs black; wings smoky yellow on base and costal half, thinly infuscate on rest; squamæ smoky yellowish.

CALOTHERESIA BIVITTATA sp. nov.

Length of body, 15 millimeters; length of wing, 12. One male, Surigao, Mindanao.

Differs from both *C. sumatrensis* and *C. formosensis* by the four thoracic vittæ of male being coalesced into two broad and even thoracic vittæ, except only that a split shows on forward half of prescutum; no preacrostichals; only 1 small median discal on intermediate segment of abdomen; pollen of upper parts pale brassy tinged, sides of body gray.

TRICHOSTYLUM FASCIATUM sp. nov.

Length of body, 9 to 10 millimeters; length of wing, 8 to 8.5. Four males, Butuan and Iligan, Mindanao (*Baker 12453*).

Dark brown, densely silvery pollinose; head silvery, frontalia dark brown; antennæ and palpi pale fulvous brown; cheek grooves fulvous brown in oblique view, wholly pollinose in direct view; whole mesoscutum, scutellum, and abdomen thickly deep soft silvery with faint suggestion of brassy, the dark parts being a lateral spot and three narrow thoracic vittæ on prescutum, over front half of postscutum with irregular hind

border, rather narrow base of scutellum, all of first apparent or second actual abdominal segment, second apparent or third actual abdominal segment except narrow front edge, less than hind half of third apparent or fourth actual abdominal segment and about hind third of fourth apparent or fifth actual abdominal segment; legs brown; wings whitish on base, smoky brown on middle and costa and following wing veins, irregular inner half nearly clear; squamæ whitish, concolorous with wing base.

DOLESCHALLA MAKILINGENSIS sp. nov.

Length of body, 11 to 13.5 millimeters; length of wing, 8 to 10. Four males, Mount Maquiling, Luzon (*Baker 1824* and *2020*).

Head dull silvery, dark brown stripe from lower border of eye to below oral margin of epistoma, parafrontalia appearing dull fulvous in oblique view; frontalia bright brown; antennæ brown, second antennal joint subfulvous to pale brownish; palpi brownish fulvous; humeri, pleura, and sides of mesoscutum silvery with slight brassy tinge, leaving two heavy irregular dark thoracic vittæ with a linelike one confluent with each on its inner side; scutellum bright brown, tip and postscutellum dull silvery pollinose; brown blotch under wing base; abdomen brown to dark brown, sides of first three abdominal segments yellow to rufofulvous on outer half or more, bases of last three abdominal segments narrowly and evenly silvery pollinose; legs brown, coxæ pollinose; wings narrowly deeply smoky blackish on costa, very dilute on rest; squamæ glassy, with faint sordid tinge.

Genus LOPHOSIOPSIS novum

Genotype, *Lophosiopsis costalis* sp. nov., Luzon.

Differs from *Euphania* as follows: Proboscis very short, haustellum hardly longer than thick and scarcely the length of the rather large labella; palpi slender cylindric, as long as lower border of head, projecting beyond oral margin of epistoma, faintly thickened tip in male; third antennal joint three times second antennal joint in male; eyes bare, oblique, reaching far short of vibrissal level; 1 strong proclinate frontoörbital in male; frontalia well narrowed posteriorly in male, short, distance of lunula to ocellar triangle on median line twice their anterior width, width of frontalia not twice width of parafrontal in middle; parafacialia narrowed below, equal to facialia reversed; cheeks rather over one-fourth eye length; 2 or 3 postacrostichals; 1 small separated discal scutellar; apical cell narrowly open not

far before wing tip, narrow and long-pointed, spearhead-shaped; cubitulus a very wide obtuse angle, subangular, well over one-third wing width from hind margin of wing; male claws not over last tarsal joint; 1 millimeter on second apparent or third actual abdominal segment, marginal row of 6 or more on fourth apparent or fifth actual abdominal segment; actual fifth abdominal segment functioning as anal segment in male.

LOPHOSIOPSIS COSTALIS sp. nov.

Length of body, 8 millimeters; length of wing, 7. One male, Baguio, Benguet, Luzon.

Head silvery, parafrontalia more blackish through pollen; frontalia soft blackish brown, pruinose in oblique view; antennæ blackish; third antennal joint except extreme tip dusky fulvous inside, outer side and arista brown; palpi dark brown; occipital beard whitish; pleura silvery shading to dark with light incidence; mesoscutum, scutellum, and abdomen dark metallic greenish; mesoscutum and scutellum thinly silvery, leaving four dark thoracic vittæ, inner pair of thoracic vittæ—when 4 or more are present—narrow; intermediate segments of abdomen very narrowly silvery on bases but widening out on venter, extending along median line of second apparent or third actual abdominal segment and same on venter of first apparent or second actual abdominal segment; legs black, femora and coxæ silvery; wings narrowly blackish on costa from stigma to tip of third radial or second vein, rest of costa and basal cells yellowish, otherwise nearly clear; squamæ glassy.

Genus MAKILINGIMYIA novum

Genotype, *Makilingimyia melanoptera* sp. nov., Luzon.

Differs from *Zambesa* (*Z. makilingensis* Tyler-Townsend) as follows: Frontal profile not so long as facial profile; oral profile very short, beveled anteriorly; clypeus slightly depressed, equilateral, narrow, fully 3 times width of clypeus; epistoma cut off slightly above vibrissal level; facialia narrow, parallel, flattened but raised some above clypeal plane, with short microsetæ halfway or less; vibrissæ very short, barely decussate, but well differentiated; vibrissal axis scarcely two-thirds antennal axis, latter hardly three-fifths head height; proboscis short, haustellum not over one-fourth head height, labella rather large; third antennal joint narrow, four times second antennal joint or more, upper edge concave in profile, widened slightly before the truncate

tip; arista length of third antennal joint, slightly thickened halfway, short pubescent; width of vertex in male one-fourth head width, in female little more, front widening to two-fifths head width at base of antennæ; face of male in middle half head width, of female two-fifths head width and same as anterior front; frontals stopping at base of antennæ, about 6, weak, front pair or two stronger; no outer verticals, male and female, inner verticals not decussate; frontalia very wide, equilateral, over four times width of parafrontal in middle; parafrontalia with sparse setæ which descend below base of antennæ; parafacialia long, equilateral, over half in male and under half in female width of clypeus; cheeks one-fourth eye length; cheek grooves pollinose; thorax wider than abdomen; 3 sternopleurals, 2 lateral scutellars, apical scutellars strong and decussate; small cross vein normal, first long vein terminating considerably beyond it; third long vein bristled only at base or exceptionally one-third way to small cross vein; apical cell very narrowly open, practically closed, a little before wing tip; cubitulus a rounded obtuse angle; apical cross vein slightly bent in; hind cross vein over half its length from cubitulus; last section of fifth long vein half hind cross vein; squamæ rounded-subovate and widened behind; hind tarsi rather short, especially in male; abdomen narrow, equilateral, of 5 abdominal segments, little over one and a half times thorax in length, truncate behind in male; no median marginals on first apparent or second actual abdominal segment, 1 median marginal on third apparent or fourth actual abdominal segment; hypopygium in female small, anal retracted, terminating in two setose papillæ with polished knob between them, as seen in profile.

MAKILINGIMYIA MELANOPTERA sp. nov.

Length of body, 8 to 9 millimeters; length of wing, 7 to 8. Two males and one female, Mount Maquiling, Luzon (*Baker 2023*).

Head silvery, posterior narrowed part of parafrontalia blackish, face and anterior part of parafrontalia in male golden; frontalia, antennæ, and palpi brown to blackish; occipital beard grayish; pleura silvery, mesoscutum and scutellum thinly silvery leaving two heavy wide equilateral black thoracic vittæ; abdomen dark brown or blackish, basal half of intermediate segments of abdomen and whole fourth apparent or fifth actual abdominal segment thinly silvery above, sides and venter silvery except

hind half of third apparent or fourth actual abdominal segment; legs black, femora and coxæ silvery; wings black, more dilute in female; squamæ white, with narrow blackish edge in male.

Genus PHILIPPOLOPHOSIA novum

Genotype, *Philippolophosia ornata* sp. nov., Panay.

Differs from *Lophosiodes* as follows: Frontal profile nearly flat, considerably sloped, three-fourths facial profile; occipital profile a little bulged on middle; vibrissal axis fully equal to antennal axis, latter three-fifths head height; female, width of vertex one-fourth head width, front widening gently and evenly to one-third head width at base of antennæ; face in middle scarcely half head width; 1 proclinate frontoörbital in female, strong, with 1 setalike just behind it; 1 weaker divaricate reclinate frontoörbital; 3 sternopleurals, 2 postintraalars, 2 weak preacrostichal bristles, 3 postacrostichals, 1 discal scutellar weaker than apical scutellars; hind cross vein hardly its length from cubitulus; metatarsi not equal to following joints; female front tarsi not widened; 1 median marginal on first apparent or second actual abdominal segment; first hypopygial segment in female subcylindric and about twice as long as wide, second hypopygial segment bifurcate with arms toothed on inside and each with a stout, blunt, convergent terminal hook.

PHILIPPOLOPHOSIA ORNATA sp. nov.

Length of body, 12 millimeters; length of wing, 9.75. One female, northwestern Panay.

Head tawny silvery, parafrontalia light golden, occiput golden above; frontalia fulvous brown; antennæ and palpi fulvous, third antennal joint edged with brownish; occipital beard brassy; humeri, pleura, and edges of mesoscutum light golden; disk of mesoscutum dark, thinly tawny silvery pollinose; 4 dark thoracic vittæ, inner pair of thoracic vittæ—when 4 or more are present—a little narrower; scutellum fulvous, thinly light golden pollinose; abdomen subshining brown, shading to brownish fulvous or fulvous on venter; first apparent or second actual abdominal segment to third apparent or fourth actual abdominal segment thickly golden pollinose, leaving a bare wide hind border on first apparent or second actual abdominal segment, a wide triangle on posterior part of second apparent or third actual abdominal segment, narrow triangle on hind border of third apparent or fourth actual abdominal segment, while first apparent or second actual abdominal segment and second apparent or third actual

abdominal segment are largely bare on sides of venter; hypopygium rufofulvous, terminal hooks shining black; legs pale fulvous, tibiæ testaceous, tarsi black; wings light yellowish, fading on irregular inner half, wing tip touched with smoky; squamæ tawny glassy.

Genus PSEUDORECTOCERA novum

Genotype, *Pseudorectocera albifacies* sp. nov., Mindanao.

Differs from *Orectocera* as follows: Epistoma cut out extremely short, wide, rim flared; facialia finely short-ciliate in an irregular double row nearly to base of antennæ; vibrissæ well differentiated, below oral margin level, long enough for tips to meet; palpi long, somewhat bowed, inflated and somewhat flattened apically, bare on the flattened and widened tips in female; arista length of third antennal joint, considerably thickened two-thirds way and tapered, short-pubescent on upper side nearly to tip, second aristal joint twice as long as wide; cheeks one-fourth eye length; third long vein bristled one-third way or more to small cross vein; apical cell well open considerably before wing tip; tarsi scarcely elongate; abdomen subcylindric, somewhat widened on middle and well deepened posteriorly; 1 median marginal on first apparent or second actual abdominal segment.

PSEUDORECTOCERA ALBIFACIES sp. nov.

Length of body, 13 millimeters; length of wing, 10.5. One female, Dapitan, Mindanao.

Shining black; head burnished silvery, parafrontalia shading to blackish posteriorly; frontalia soft deep black, antennæ and palpi brownish black; upper central part of occiput blackish; humeri and pleura silvery; cut by brown subvertical bands between leg bases; mesoscutum thinly silvery, leaving two very heavy, regular, and approximated black thoracic vittæ; scutellum very thinly silvery; abdomen black, bases of intermediate segments of abdomen silvery, widening on sides and venter, first apparent or second actual abdominal segment showing some rust brown pollen on venter; legs black, femora and coxæ silvery on outside; wings deeply black infuscate, with lighter areas in apical cell, discal cell, and on inner margin; squamæ white, subtranslucent.

Genus ZAMBESA Walker

The new species described below appears to agree well with the characters of the genotype of *Zambesa;* but, since no positive

assurance can yet be given on this point, its generic characters are here described.

Body elongate and narrow; head not much wider than high; frontal profile nearly straight, sloped but very prominent, hardly longer than facial profile; latter extremely receding, straight, at right angle to frontal profile or slightly greater; oral profile half length of frontal profile, slightly arcuate; occipital profile a little inflated below; clypeus moderately sunken, length of clypeus over twice width of clypeus; facial carina showing only as a faint sharp ridge on median line; epistoma full width, very short, edge scarcely warped; facialia bare, narrow, rather on edge, a few bristles next vibrissæ; vibrissæ strong, decussate, on oral margin of epistoma and on lower border of head; vibrissal axis hardly over half antennal axis, latter three-fourths head height; proboscis half head height, stout, labella very large, haustellum shorter than labella; palpi long, clavate and swollen, but not very stout, bowed, rather longer than labella; base of antennæ well above eye middle; antennæ long, reaching oral margin level, second antennal joint short, third antennal joint about six times second antennal joint and equilateral; arista long, bare, thickened not one-fourth way, basal joints short; eyes bare, somewhat oblique, cut out a little on lower hind border, not reaching vibrissal level; female width of vertex one-fourth head width, front widening faintly to one-third head width at base of antennæ, a little depressed between eyes in front view; face only slightly widened from front in female, not two-fifths head width in middle, appearing little wider than front but wider than width of eye; frontals 5, hugging edge of frontalia and stopping before base of antennæ; 2 verticals, male and female, inner verticals decussate; 2 proclinate frontoorbitals and 1 reclinate frontoörbital, male and female; frontalia in female equilateral, rather over width of parafrontal in middle; ocellars proclinate; parafrontalia widened anteriorly and produced, sloped 45°, practically bare; parafacialia bare, narrowed some below, no wider than facialia in middle, at 40° to clypeal plane; no facioörbitals nor genoörbitals; cheeks one-sixth eye length; cheek grooves small; thorax same width as abdomen, little narrower than head; 2 strong sternopleurals and postintraalars, 3 postsutural dorsocentrals, 2 or 3 short but rather strong preacrostichals, 2 fairly long postacrostichals; prescutum and postscutum about equal in length; 2 long strong lateral scutellars, no apical scutellars, usually 1 discal scutellar; wings

rather long and narrow, costal spine absent; first long vein bare, terminating little beyond wing middle; small cross vein distinctly to far basad of second subcostal or auxiliary vein termination, scarcely over 3 times its short length from costal side of third long vein origin; third long vein bristled only at base, yet the 3 or 4 bristles placed at usual distance apart reach halfway to small cross vein; apical cell short-petiolate fairly well before exact wing tip, stalk in line with third long vein and not so long as small cross vein; cubitulus an obtuse angle, one-fourth wing width from hind margin of wing; apical cross vein crooked, not parallel to hind margin of wing, bent in before tip; no stump of vein at cubitulus; hind cross vein strongly sinuate, much nearer cubitulus, yet over its length from same; fifth long vein bare, last section not one-third preceding; squamæ small, rounded, level part subcircular; tarsi rather long; hind tibiæ with short hairs and few bristles; middle metatarsi and hind metatarsi equal to following joints; front tarsi in female normal; male and female claws equal to last tarsal joint; abdomen nearly equilateral, thickening posteriorly in profile but appearing cylindric from above, twice length of thorax; basal of first actual abdominal segment showing distinctly from above and fully half length of first apparent or second actual abdominal segment, noticeably narrower than latter, so that abdomen is somewhat constricted at base; 1 strong median marginal on first 2 abdominal segments, 1 median discal on last 3 abdominal segments, marginal row on last 2 abdominal segments; hypopygium in female large, caudoventral aspect.

ZAMBESA MAKILINGENSIS sp. nov.

Length of body, 11 millimeters; length of wing, 9.5. Two females, Mount Maquiling (*Baker 2019*) and Los Baños, Luzon. One male, Surigao, Mindanao (*Baker 23237*), is evidently the same genus and probably the same species.

Head, pleura, and coxæ deeply silvery pollinose; frontalia dark brown, antennæ lighter brown, arista pale yellowish on thickened part; palpi fulvous to dark brown, in latter case (Los Baños) pale yellowish below and on tips; mesoscutum and scutellum thinly silvery, lateral and hind edges of both prescutum and postscutum deeply silvery, two narrow brown thoracic vittæ on prescutum with a brownish spot each side, disk of postscutum brown; abdomen brown to dark brown or blackish, venter of first apparent or second actual abdominal segment to third ap-

parent or fourth actual abdominal segment pale yellow except hind border; dorsum of basal or first actual abdominal segment and first apparent or second actual abdominal segment blackish or brown, with more or less yellowish showing on each side of first apparent or second actual abdominal segment; dorsum of second apparent or third actual abdominal segment yellow except hind border and wide median vitta; front half of third apparent or fourth actual abdominal segment yellow, except a broad median triangle; abdomen silvery pollinose on bases of all abdominal segments and whole fourth apparent or fifth actual abdominal segment; legs dark brown to blackish, femora except tips yellow, tibiæ with more or less yellowish on middle; wings lightly smoky yellow, with clearer central area; squamæ watery to pearly whitish.

RHODOGYNE PHILIPPENSIS sp. nov.

Length of body, 7 millimeters; length of wing, 5.5. One male, Mount Maquiling, Luzon (*Baker 7154*).

Head pale golden yellow pollinose, parafrontalia and posterior half of frontalia deeper golden, viewed from before, rest of frontalia brownish fulvous; antennæ and occipital area of cheeks brown, palpi very pale fulvous; occipital beard brassy; mesoscutum, tip of scutellum, and postscutellum dull golden, rest of scutellum and over hind half of postscutum shining blackish except median spot on hind margin of latter; abdomen orange-yellow, extreme base and median spot on hind margin of first 3 abdominal segments brownish black; legs blackish brown; wings broadly fulvous yellow costobasally, blackish infuscate across middle and nearly clear on tip and hind border; squamæ pale golden.

Genus CRYPTOSPYLOSIA novum

Genotype, *Cryptospylosia angustifrons* sp. nov., Luzon.

Differs from *Spylosia* as follows: Frontal profile equal to facial profile; clypeus moderately sunken, nearly equilateral, length of clypeus two and a half times width of clypeus; facialia ciliate with 9 to 11 strong bristles nearly to lowest frontals; vibrissal axis two-thirds antennal axis, latter three-fourths head height; palpi rather longer than haustellum, bowed; base of antennæ well above eye middle; third antennal joint in male five times second antennal joint, narrow, equilateral; eyes thickly long-hairy, oblique, reaching well short of vibrissal level; male width of vertex one-tenth head width, front narrowed somewhat before ocellar triangle and then, widening to

one-fifth head width at base of antennæ; face in middle two-fifths head width; 1 or 2 reclinate frontoörbitals in male, weak; male frontalia not equal to width of parafrontal in middle; parafacialia a little narrowed below, no wider at narrowest than widest part of facialia; cheeks two-sevenths eye length; 3 sternopleurals, 2 preacrostichals, 2 postacrostichals, 3 long slim lateral scutellars, no apical scutellars; costal spine very short; no wrinkle at cubitulus; 2 median discals in file on intermediate segments of abdomen in male.

CRYPTOSPYLOSIA ANGUSTIFRONS sp. nov.

Length of body, 10.5 millimeters; length of wing, 9. One male, Baguio, Benguet, Luzon (*Baker 23246*).

Head gray cinereous, with faint brassy sheen on occiput, parafrontalia, and parafacialia; frontalia and antennæ brown, third antennal joint slightly ferruginous on extreme base; palpi fulvous yellow; pleura brassy ashy; mesoscutum and scutellum silvery whitish, base of scutellum and rectangle in middle of postscutum next transverse suture of mesoscutum brown; 4 black thoracic vittæ, inner pair of thoracic vittæ—when 4 or more are present—somewhat narrower before transverse suture of mesoscutum and merged in a brown rectangle behind same; abdomen rufofulvous, depression of first apparent or second actual abdominal segment, median vitta, and hind borders of other abdominal segments dark brown to blackish, last two abdominal segments and base of second apparent or third actual abdominal segment thinly silvery; legs blackish, femora brownish; wings faintly yellowish on base and costa; squamæ yellowish, whitish on inner disk.

Genus BOTRIOPSIS novum

Genotype, *Botriopsis bakeri* sp. nov., Luzon.

Differs from *Botria* as follows: Frontal profile four-fifths facial profile; epistoma long, full width, not twice as long as wide; facialia heavy, wide, faintly bowed, oblique inside and outside crests, ciliate with strong bristles to lowest frontals; vibrissæ well above oral margin level; haustellum one-third head height, labella very large; palpi length of haustellum; width of vertex in female two-fifths head width, front widening rapidly to five-ninths head width at base of antennæ; face in middle nearly two-thirds head width; female with 1 vertical, 2 proclinate frontoörbitals and 3 reclinate frontoörbitals; frontalia hardly half width of parafrontal in middle; no ocellars; parafa-

cialia above equal to width of clypeus, narrowed below, setose on upper two-thirds; prescutum far shorter than postscutum; apical scutellars half length of lateral scutellars, strongly decussate; cubitulus rounded nearly right angled or faintly obtuse angled, apical cross vein well bent in at base; hind tibiæ ciliate with long and short bristles.

BOTRIOPSIS BAKERI sp. nov.

Length of body, 11 millimeters; length of wing, 10. One female, Baguio, Benguet, Luzon.

Head dull golden; frontalia and antennæ blackish, second antennal joint and base of third antennal joint rufous; palpi fulvorufous; pleura and mesoscutum dull golden; 5 blackish thoracic vittæ, median vitta narrower and reaching as far back as outer pair of thoracic vittæ, inner pair of thoracic vittæ—when 4 or more present—stopping in middle of postscutum; scutellum rufotestaceous, thinly dull golden pollinose; abdomen dull golden pollinose, first apparent or second actual abdominal segment and broad hind borders of intermediate segments of abdomen blackish, latter color giving out on venter; femora dull golden pollinose, tibiæ dull rufous, tarsi blackish; wings pale yellowish smoky on base and narrow costal margin; squamæ glassy whitish, with yellow edges.

Genus PROPHORICHAETA novum

Genotype, *Prophorichaeta philippina* sp. nov., Luzon.

Differs from *Phorichaeta* as follows: Vibrissal axis scarcely less than antennal axis, latter little over half head height; proboscis two-thirds head height; second antennal joint short, third antennal joint 3 times second antennal joint; 1 vertical in female, not descussate; 2 proclinate frontoörbitals in female, strong; cheeks two-fifths eye length; 3 sternopleurals, 2 preacrostichals; third long vein bristled two-thirds to three-fourths way to small cross vein; stalk of apical cell little over small cross vein; hind cross vein somewhat nearer cubitulus; last section of fifth long vein equal to hind cross vein.

PROPHORICHAETA PHILIPPINA sp. nov.

Length of body, 6.5 millimeters; length of wing, 5. One female, Baguio, Benguet, Luzon.

Head and body metallic dark greenish; head silvery; frontalia brown, with bloom in oblique view; antennæ blackish, extreme base of third antennal joint faintly reddish; palpi obscure brownish; thorax very thinly silvery, mesoscutum and scutellum with

scarcely traces of pollen on disk; abdomen with last three abdominal segments thinly bluish silvery on base; legs black; wings tinged with brownish on costa and wing veins; squamæ tawny.

Genus PHILIPPODORIA novum

Genotype, *Philippodoria fasciata* sp. nov., Mindanao.

Differs from *Zizyphomyia* as follows: Epistoma one-fourth as long as wide; vibrissæ a little above oral margin level; palpi well thickened at tip in male; second antennal joint short; third antennal joint in male five times second antennal joint, moderately wide, equilateral, subtruncate at tip; eyes large, slightly oblique, reaching oral margin level; male, width of vertex two-sevenths head width, front equilateral on hind half and then widening very gradually to hardly one-third head width at base of antennæ; face only widening slightly from front, little over one-third head width in middle; frontals 8 in all, 3 below base of antennæ; only 1 frontal row in male; parafacialia narrowed below, half width of clypeus above and one-third width of clypeus below, microsetose above, not transversely corrugated; cheeks one-eighth eye length in male; 4 lateral scutellars; costal spine short but distinct; cubitulus right angled, angular, hardly one-fifth wing width from hind margin of wing; apical cross vein deeply arcuate inward; metatarsi equal to following joints.

PHILIPPODORIA FASCIATA sp. nov.

Length of body, 7 millimeters; length of wing, 6. One male, Kolambugan, Mindanao.

Head silvery; parafrontalia, ocellar triangle, and upper occipital orbits light golden; frontalia and antennæ blackish; palpi fulvous; sternopleura silvery, mesopleura with more golden tinge; mesoscutum, apical half of scutellum, and less than basal half of last three abdominal segments golden pollinose including postscutellum, rest of scutellum and abdomen black; 4 black thoracic vittæ, inner pair of thoracic vittæ—when 4 or more are present—shorter; legs brownish black; wings nearly clear, very faintly yellowish on costa and wing veins; squamæ whitish, faintly tinged with yellowish.

Genus STURMIODORIA novum

Genotype, *Sturmiodoria facialis* sp. nov., Basilan.

Differs from *Philippodoria* as follows: Clypeus scarcely depressed or but faintly so, length of clypeus twice width of cly-

peus; epistoma cut short; facialia bare, flattened and ironed practically into clypeal plane; vibrissæ on oral margin level; haustellum short and bulbous, scarcely longer than the large labella; base of antennæ little above eye middle; female, third antennal joint hardly three and a half times second antennal joint, equilateral, rather wide, subtruncate; eyes not oblique, reaching vibrissal level; female, width of vertex two-sevenths head width, front widening to two-fifths head width at base of antennæ; face nearly equilateral, four-ninths head width in middle and below; frontals 1, below base of antennæ; 2 proclinate frontoörbitals and 3 reclinate frontoörbitals in female; frontalia faintly widened posteriorly in female, little over half width of parafrontal in middle, with long fine hairs on edges; no ocellars; cubitulus rounded right angled; apical cross vein gently bent in before halfway point; hind cross vein not its length from cubitulus.

STURMIODORIA FACIALIS sp. nov.

Length of body, 9 millimeters; length of wing, 7. One female, Basilan (*Baker 11780*).

Head silvery; frontalia and antennæ brown, base of third antennal joint slightly tinged with ferruginous; palpi fulvous; pleura and mesoscutum silvery gray; 4 blackish thoracic vittæ, inner pair of thoracic vittæ—when 4 or more are present—narrower; scutellum blackish on base, narrowly testaceous on tip, silvery gray pollinose; abdomen blackish, last three abdominal segments except hind borders silvery gray pollinose; legs blackish; wings nearly clear; squamæ whitish, faintly tawny, with yellow edges.

Genus EOCARCELIOPSIS novum

Genotype, *Eocarceliopsis bakeri* sp. nov., Mindanao.

Differs from *Hemisturmia* as follows: Clypeus narrowed upward, length of clypeus rather over twice width of clypeus; epistoma gently warped; facialia bare; vibrissal axis hardly two-thirds antennal axis; latter little over half head height; haustellum hardly one-third head height, labella nearly as long; eyes reaching far below oral margin level; male, width of vertex one-fifth head width, front equilateral on hind half and then widening to less than one-third head width at base of antennæ; face in middle two-fifths head width; 2 reclinate frontoörbitals in male; frontalia well narrowed posteriorly, equal to width of

parafrontal in middle; ocellars strong; cheeks scarcely one-tenth eye length; cubitulus angular; no wrinkle at cubitulus; metatarsi equal to following joints, middle metatarsi exceed same; abdomen short-ovate; 1 weaker median marginal on first apparent or second actual abdominal segment, 1 strong median marginal on second apparent or third actual abdominal segment.

EOCARCELIOPSIS BAKERI sp. nov.

Length of body, 9 millimeters; length of wing, 7.5 Two males, Dapitan, Mindanao (*Baker 12459*).

Head dull silvery gray, parafrontalia with a very faint brassy tinge; frontalia and antennæ brown; palpi fulvous; pleura dull silvery, mesoscutum same with scarcely perceptible tinge of brassy; 4 blackish thoracic vittæ, inner pair of thoracic vittæ—when 4 or more are present—very narrow before transverse suture of mesoscutum; scutellum blackish on basal half, fulvous on crescentic marginal area, thinly silvery and tawny pollinose; abdomen blackish, basal half or more of last three abdominal segments brassy silvery; legs dark brownish, tibiæ blackish; wings nearly clear, scarcely yellowish on costa; squamæ slightly yellowish tinged.

A female from the same locality is closely similar in appearance and color, but may not belong here. The eyes scarcely reach oral margin level and the cheeks are one-fifth eye length, while the front and face are much wider, front being nearly half head width at base of antennæ and face fully half head width in middle.

Genus PSEUDOKEA novum

Genotype, *Pseudokea neowinthemioides* sp. nov., Mindanao.

Differs from *Okeopsis* as follows: Epistoma warped; facialia flattened and ironed almost into clypeal plane, only slightly oblique, width of facialia quite twice width of parafacial; vibrissal axis a little less than antennal axis, latter two-thirds head height; arista longer than whole antennæ, slender throughout; frontals 2 below base of antennæ; verticals 1 in male, not decussate; frontalia haired, a little narrowed posteriorly, twice width of parafrontal in middle; cheeks one-seventh eye length and nearly completely inferior aspect; apical scutellars decussate, as long as middle lateral scutellars; hind tibiæ thickly ciliate with flattened bristles, without longer bristle; no median marginals on first two abdominal segments.

PSEUDOKEA NEOWINTHEMIOIDES sp. nov.

Length of body, 10 millimeters; length of wing, 7. One male, Cagayan, Mindanao.

Head silver gray; frontalia and antennæ brown, third antennal joint mostly paler; palpi fulvous; facialia brown; pleura and humeri silvery gray; mesoscutum thinly silvery, 4 blackish thoracic vittæ, inner pair of thoracic vittæ—when 4 or more are present—narrow; scutellum fulvous, narrowly brown on base, silvery pollinose; abdomen subfulvous, dorsal depression of first apparent or second actual abdominal segment, middle of second apparent or third actual abdominal segment, middle and hind border of third apparent or fourth actual abdominal segment, and whole fourth apparent or fifth actual abdominal segment brown or blackish; over front half of intermediate segments of abdomen and narrow base of fourth apparent or fifth actual abdominal segment silvery pollinose; hypopygium fulvous, legs dark brown, tarsi more blackish; wings yellowish on base and costa; squamæ whitish, edges faintly yellow.

Genus EUHYPOCHAETOPSIS novum

Genotype, *Euhypochaetopsis orientalis* sp. nov., Luzon.

Differs from *Hypochaetopsis* as follows: Frontal profile only faintly curved, nearly equal to facial profile; clypeus dished, epistoma well warped; male, third antennal joint four and a half times second antennal joint, not thickened; arista strongly thickened little over one-fourth way; eyes rather thickly pilose, pushed forward below but occipital area of cheeks following close to their hind borders; male, width of vertex little over one-fifth head width, front at base of antennæ three-elevenths head width; frontals, 2 closely set below base of antennæ, and 3 or 4 above; costal spine very short and practically absent; apical cell moderately widely open; cubitulus nearly one-third wing width from hind margin of wing.

EUHYPOCHAETOPSIS ORIENTALIS sp. nov.

Length of body, 7 millimeters; length of wing, 7. One male, Baguio, Benguet, Luzon.

Head, pleura, and venter silvery whitish; front including frontalia, mesoscutum, scutellum, and dorsum of abdomen pale brassy pollinose; antennæ black; palpi fulvous; 4 equal, narrow, olive brown thoracic vittæ; first apparent or second actual abdominal segment and hind half or so of last three abdominal

segments obscure blackish; legs blackish, tibiæ subfulvous; wings smoky yellowish except inner border; squamæ glassy yellowish.

Genus HYSTRICOVORIA novum

Genotype, *Hystricovoria bakeri* sp. nov., Luzon.

Differs from *Catalinovoria* as follows: Head width one and a half times head height; frontal profile strongly arcuate, little over facial profile; occipital profile not bulged; head profile semicircular; clypeus well sunken, narrow, over twice width of clypeus; epistoma cut short; facialia flattened-oblique; vibrissæ on oral margin level; vibrissal axis hardly two-thirds antennal axis, latter three-fifths head height; proboscis very short; haustellum small, bulblike, equal to labella; palpi short, clavate, with few bristles; male, third antennal joint two and a half times second antennal joint; eyes reaching slightly below vibrissal level; male, width of vertex one-third head width, front faintly widening to middle; face and anterior front equilateral, little over one-third head width; 4 frontals in all, 2 widely separated below base of antennæ and reaching to aristal level; 3 reclinate frontoörbitals in male, hind divaricate and short, the other 2 strong; frontalia two-thirds width of parafrontal in middle; ocellar triangle very large, triangular, splitting frontalia one-third way; parafacialia bare, strongly narrowed below, peglike, almost pointed below; cheeks one-eighth eye length, occipital area of cheeks scarcely entering; 2 sternopleurals, no pteropleurals, 2 postintraalars; cubitulus two-fifths wing width from hind margin of wing; hind cross vein much nearer to small cross vein, nearly straight, nearly parallel to hind margin of wing and apical cross vein; last section of fifth long vein four-fifths preceding; metatarsi not equal to following joints; 1 erect median marginal on second apparent or third actual abdominal segment.

HYSTRICOVORIA BAKERI sp. nov.

Length of body, 5.5 millimeters; length of wing, 4. One male, Mount Maquiling, Luzon.

Head bluish silvery, frontalia brown; antennæ black, basal joints reddish yellow; palpi pale fulvous, thorax bluish silvery, 4 indistinct black thoracic vittæ, inner pair of thoracic vittæ—when 4 or more are present—narrow; abdomen shining black, bases of intermediate segments of abdomen bluish silvery; legs black; wings clear; squamæ nearly white.

Genus ORILLIOPSIS novum

Genotype, *Orilliopsis orientalis* sp. nov., Luzon.

Differs from *Brachymeropsis* as follows: Oral profile not long, well beveled anteriorly; clypeus narrow, length of clypeus two and a half times width of clypeus; epistoma gently curve-warped from clypeus; haustellum setose and two-thirds head height; palpi slender, subfiliform, half length of haustellum, bristled, not thickened at tip; second antennal joint short, third antennal joint three and a half times second antennal joint in female; arista thickened halfway and tapered; female, width of vertex fully one-third head width, front nearly equilateral but over one-third head width at base of antennæ; face and anterior front equilateral; frontals 3 in all; inner verticals not decussate; prescutum a little shorter than postscutum; 2 sternopleurals and 1 very weak one below; no costal spine; squamæ small, little widened, rather rounded behind; abdomen cylindric, nearly twice length of thorax, of 4 abdominal segments, intermediate segments of abdomen longer than the others.

ORILLIOPSIS ORIENTALIS sp. nov.

Length of body, 6.5 millimeters; length of wing, 5. One female, Mount Maquiling, Luzon.

Head silvery white, parafrontalia blackish posteriorly; frontalia dark brown; antennæ and palpi blackish; pleura silvery; mesoscutum and scutellum very thinly pollinose from side view, appearing bare shining blackish when viewed from above; 4 black thoracic vittæ faintly outlined before transverse suture of mesoscutum in oblique view; abdomen black, bases of last three abdominal segments thinly silvery; legs black; wings clear; squamæ glassy.

BRACHYMEROPSIS LUZONENSIS sp. nov.

Length of body, 6.5 millimeters; length of wing, 5.5. One male, Baguio, Benguet, Luzon.

Differs from *B. sumatrensis* Tyler-Townsend by the palpi being much shorter than third antennal joint, apical cell practically closed, costal spine very short, prescutum more shining, and thoracic vittæ much less distinct.

APHRIMYOBIA JAPONICA sp. nov.

Length of body, 7.75 millimeters; length of wing, 6.5. One female, Kobe, Japan.

Differs from *A. simillima* Tyler-Townsend by the third antennal joint being three times second antennal joint, arista

short-pubescent, width of vertex two-sevenths head width, front at base of antennæ one-third head width, ocellars differentiated but very fine and short, 1 postacrostichal, 2 preacrostichals, no discal scutellars, apical cell very narrowly open a little before wing tip, apical cross vein slightly arcuate inward, pollen of mesoscutum and scutellum silvery but very thin, second apparent or third actual abdominal segment black above except narrow front border on each side of median vitta, wings yellowish costally, squamæ nearly white. The prescutum is much shorter than the postscutum.

230667——4

DIE STAPHYLINIDEN DER PHILIPPINEN

24. BEITRAG ZUR INDO-MALAYISCHEN STAPHYLINIDENFAUNA

Von MAX BERNHAUER

Öff. Notar in Horn, Nied. Oesterreich

Genus PAEDERUS Fabricius

1. Geflügelte Arten, Flügeldecken länger als der Halsschild ..... 2.
   Ungeflügelte Arten, Flügeldecken viel kürzer als der Halsschild ..... 4.
2. Hinterleib einfarbig bläulich schwarz, Halsschild rotgelb, der übrige Körper blau, Beine schwarz. LUZON, Provinz Mountain, Trinidad (*Banks*); Baguio (*Baker*): Provinz Rizal, Montalban Gorge (*Banks*) ..... **P. philippinus** Bernhauer.
   Hinterleib rötlichgelb mit schwarzer Spitze ..... 3.
3. Kopf so lang als breit, weitläufig punktiert, Flügeldecken sehr fein und spärlich punktiert. LUZON, Manila (*Banks*): Provinz Laguna, Los Baños, Mount Maquiling (*Baker*); ausserdem von den Sunda-Inseln bekannt ..... **P. intermedius** Boheman.
   Kopf viel länger als breit, dicht runzelig punktiert, Flügeldecken ziemlich kräftig und sehr dicht runzelig punktiert. Ziemlich glänzend, dünn gelblich behaart, Kopf und Hinterleibsspitze schwarz, die Brust pechfarben, der Halsschild, das Schildchen, die vier ersten freiliegenden Hinterleibsringe, die Wurzel der schwärzlichen Fühler, die Taster und Beine rötlichgelb, die Knie nicht gebräunt. Kopf fast von der Form eines regelmässigen Sechseckes, kräftig und ziemlich gleichmässig dicht runzelig punktiert, ziemlich matt. Fühler mässig lang, die vorletzten Glieder doppelt so lang als breit. Halsschild oblong, ziemlich schmal, glänzend, im ersten Drittel am breitesten, nach vorn gerundet, nach rückwarts geradlinig verengt, ausser der breiten, unpunktierten Mittelzone mässig fein und ziemlich weitläufig punktiert. Flügeldecken viel länger als der Halsschild, viel länger als zusammen breit, mässig glänzend. Hinterleib fein und wenig dicht, am siebenten Tergit dichter und feiner punktiert. Länge, 7 Millimeter. SAMAR, Catbalogan (*Böttcher*) ..... **P. samarensis** sp. nov.
4. Kopf und Halsschild stark metallisch glänzend blaugrün bis messingfarben, der übrige Körper schwarz, die Wurzel des achten Tergites gelb, die Fühler schwarz, die zwei ersten Glieder, die Wurzel des dritten und das Endglied rötlichgelb, die Taster rötlichgelb mit geschwärzter Spitze des vorletzten Kiefertastergliedes, die Beine schwarz, die äusserste Wurzel der Schenkel, bei var. *lividipes* die Basalhälfte der Schenkel rötlichgelb. Kopf kurz elliptisch innerhalb der Fühlerhöcker mit je einem starken Eindruck, glänzend glatt, neben den Augen mit einigen ungleich grossen Punkten, auf der hinteren Hälfte mit wenigen weiteren sehr feinen Punkten. Fühler dünn und lang, die vorletzten Glieder dreimal so lang als breit.

Halsschild hoch gewölbt, kurz eiförmig mit zwei etwas unregelmässigen Rückenreihen, sonst nur gegen die Vorderecken mit wenigen sehr feinen Pünktchen. Flügeldecken nur ein Drittel so lang als der Halsschild, an der Naht, kürzer als am Hinterrande breit, matt chagriniert, mit einigen seichten Punkten, vor der Basis mit einem mehr oder minder tiefen und grossen Eindruck. Hinterleib chagriniert, jedoch ziemlich glänzend, fein und spärlich punktiert. Die Seiten des Körpers mit mässig langen, schwarzen Borsten besetzt. Länge, 12 bis 13 Millimeter. Beim Mann ist das sechste Sternit der ganzen Länge nach schmal ausgeschnitten, die Seiten des Ausschnittes parallelseitig, dessen Spitze verrundet. LUZON, Provinz Mountain, Mount Polis und Pauai (Haight's place) (*Böttcher*).

, **P. semiviridis** sp. nov.

Kopf und Halsschild nicht metallisch glänzend ..... 5.

5. Kopf schwarz ..... 6.

Kopf rötlichgelb ..... 9.

6. Flügeldecken glänzend, nicht chagriniert, fein aber scharf punktiert, pechschwarz, glänzend, spärlich graugelb behaart, die Flügeldecken schwarzblau, die Taster und die ganzen Beine sowie die Wurzel und Spitze der gebräunten Fühler rötlichgelb. Kopf rundlich, fast so breit als der Halsschild, spärlich und unregelmässig punktiert. Fühler mässig lang, die vorletzten Glieder kaum doppelt so breit als lang. Halsschild eiförmig, gewölbt, etwas breiter als die Flügeldecken, mit zwei mässig feinen Rückenreihen, seitlich spärlich und unregelmässig punktiert. Flügeldecken nach rückwärts erweitert, schmal, an der Naht fast um die Hälfte länger als breit, vor der Basis eingedrückt, deutlich und ziemlich dicht punktiert. Hinterleib fein und sehr spärlich punktiert. Länge, 6.5 Millimeter. LUZON, Provinz Mountain, Trinidad (*Böttcher*). Ein einziges Stück.

P. bang-haasi sp. nov.

Flügeldecken matt chagriniert, nicht oder nur undeutlich punktiert .... 7.

7. Halsschild oblong, an den Seiten nur mässig erweitert, wenig breiter als die Flügeldecken, Mittel- und Hinterschenkel an der Spitze breit geschwärzt. PALAWAN, Binaluan. LUZON, Provinz Mountain, Mount Polis (*Böttcher*) ..... **P. lativentris** Wendeler.

Halsschild viel kürzer, an den Seiten stark erweitert, mindestens um die Hälfte breiter als die Flügeldecken, die Schenkel nicht oder nur wenig angedunkelt ..... 8.

8. Flügeldecken und Hinterleib dunkel schwarzblau, erstere ganz matt, Halsschild doppelt so breit als die Flügeldecken. Der Körper ist schwarz, die Taster, Beine, und Fühler rötlichgelb, letztere mit geschwärzten mittleren Gliedern, die Knie der Mittel- und Hinterbeine schwach gebräunt. Kopf viel schmäler als der Halsschild, sechseckig, etwas länger als breit, nach rückwärts geradlinig verengt, die Augen vor der Mitte gelegen, die Oberfläche mit wenigen feinen Punkten. Fühler gestreckt, die vorletzten Glieder doppelt so lang als breit. Halsschild mächtig entwickelt, kugelig gewölbt, um ein Viertel breiter als lang, vor der Mitte am breitesten, nach vorn und rückwärts gleichmässig gerundet verengt, auf der Oberfläche unpunktiert, spiegelblank. Flügeldecken halb so breit und ein Drittel so lang

als der Halsschild, nach rückwärts erweitert, an der Naht so lang als am Hinterrande breit, matt chagriniert und mit wenigen seichten Punkten besetzt, vor der Mitte stark quer eingedrückt. Hinterleib quer gestrichelt chagriniert, aber doch ziemlich glänzend, nach rückwärts stark erweitert, einzeln punktiert. Länge, 7 Millimeter. LUZON, Provinz Nueva Vizcaya, Imugan (*Böttcher*). Ein einzelnes Stück ..... **P. grandicollis** sp. nov.

Flügeldecken und Hinterleib schwarz, erstere weniger dicht chagriniert, deutlich etwas glänzend. Kopf etwas kürzer und breiter, nach rückwärts sanft gerundet verengt. Fühler fehlend. Halsschild etwas länger, weniger breit und weniger gewölbt, nur um die Hälfte breiter als die Flügeldecken, diese etwas breiter. Länge, etwas über 7 Millimeter. MINDANAO, Provinz Zamboanga, Dapitan (*Baker*). Ich besitze von dieser Art nur ein einziges Exemplar.

P. bakerianus sp. nov.

9. Halsschild dunkel, kugelig. Pechbraun, der Halsschild dunkler, der Kopf rötlichgelb, bisweilen seitlich mit einem dunklen Längswisch, die drei ersten freiliegenden Hinterleibsringe heller braun, das vierte freiliegende (sechste Tergit) und die schmale Wurzel der folgenden Tergite und die korrespondierenden Teile der Sternite rötlichgelb, die Taster und Beine, sowie die Wurzel und die Spitze der sonst geschwärzten Fühler blass rötlichgelb, die Knie ziemlich breit gebräunt. Kopf kurz elliptisch, schmäler als der Halsschild, nur ganz vereinzelt punktiert. Fühler sehr gestreckt, dünn, die vorletzten Glieder dreimal so lang als breit. Halsschild beim Mann fast kugelig, nur wenig länger als breit, beim Weib viel schmäler und länger, nur um die Hälfte breiter als die Flügeldecken, vor der Mitte am breitesten, mit wenigen Punkten besetzt. Flügeldecken schmal, beim Mann nur halb so breit als der Halsschild, bei beiden Geschlechtern halb so lang als dieser, ziemlich matt chagriniert, einzeln und undeutlich körnig punktiert, vor der Mitte quer eingedrückt, im übrigen sehr uneben. Hinterleib nach rückwärts etwas erweitert, ziemlich kräftig und spärlich punktiert, ziemlich glänzend. Der Körper ist mit zahlreichen langen, schwarzen Borsten besetzt. Länge, 7 bis 9 Millimeter. Beim Mann ist das sechste Sternit schmal und gleichbreit, der ganzen Länge nach ausgeschnitten. LUZON, Provinz Nueva Vizcaya, Imugan (*Böttcher*) ..... **P. flaviceps** sp. nov.

Halsschild rötlichgelb, eiförmig. Von dem vorigen durch Färbung, längeren Halsschild, kürzere viel dichter skulptierte Flügeldecken verschieden. Der Körper ist blassgelb, die Hinterleibsspitze und die Knie breit schwärzlich. Der Halsschild ist um die Hälfte länger als breit, die Flügeldecken matt chagriniert, noch unebener als beim vorigen, mit zahlreichen, Borsten tragenden Körnchen besetzt. Ich war fast versucht, diese Art nur für ein unreifes Stück des *flaviceps* zu halten. Da jedoch die dunkle Färbung der Schenkel sich viel weiter, bis über die Mitte erstreckt, was bei einem unausgefärbten Exemplar gewiss nicht der Fall wäre, bin ich der Meinung, dass wir es hier mit einer von *flaviceps* verschiedenen Art zu tun haben. Länge, 6.2 Millimeter (bei eingezogenem Hinterleib). LUZON, Provinz Mountain, Balbalan (*Böttcher*) ..... **P. lividus** sp. nov.

PHILIPPINE SURGEON FISHES AND MOORISH IDOLS

By Albert W. Herre

Chief, Division of Fisheries, Bureau of Science, Manila

SIXTEEN PLATES AND TWO TEXT FIGURES

ACANTHURIDÆ

SURGEON FISHES

Body more or less oblong or ovoid, usually elevated, and much compressed laterally, the skin more or less leathery and covered with small to minute, more or less shagreenlike scales; the tail is armed on each side with one to several acute movable spines, or fixed knives or sharp-keeled bony plates, or these may be reduced to mere tubercles; in most the spines or knifelike plates form very efficient cutting weapons. Mouth small to very small, often placed very low, terminal or inferior, each jaw with a single row of fixed or movable incisors; vomer and palatines toothless; premaxillaries slightly movable but not protractile, the short maxillary closely united to premaxillary; gill rakers obsolete; pseudobranchiæ large; gills 4, a slit behind the fourth; gill membranes attached to isthmus, the openings restricted to the sides; dorsal fin single, usually with strong spines, the rayed portion longer than the spinous part; anal fin like the soft dorsal; ventrals thoracic, I–5 or I–3; the intestinal canal long, often much convoluted, pyloric cæca present; air bladder large, forked posteriorly; vertebræ $9 + 13 = 22$. The pelvic bones long, narrow, curved, closely connected, evident through the skin.

Herbivorous shore fishes, some representatives occurring in all tropical seas, mostly small to medium in size, a few kinds reaching a length of about two-thirds of a meter. All of them are edible and some are excellent eating when properly prepared. Mostly they are dull-colored, brown or blackish fishes, but a few are gaudily striped or marked or brilliantly decorated; some kinds are notable for their singular or fantastic appearance.

The young of these fishes present an entirely different appearance in their earlier stages, and a number of kinds were described under the name *Acronurus*, a genus created for these

larval forms. In the very young the body is proportionately shorter and more or less orbiculate or disklike; there are no scales, but the skin is corrugated with numerous transverse vertical striæ or folds, the opercles and breast silvery. As yet no one has made sufficiently extensive studies of the larval development and *Acronurus* stages of these fishes to be able to say positively to what species they belong, except in a very few cases.

Japanese fishermen catch them by the *muro ami* net method, sometimes a single haul netting as much as 2,000 kilograms. The surgeon fishes occur in schools about submerged reefs, at moderate depths, coming into shoal water to feed. Comparatively few are caught by the fishing methods of the Christian Filipinos. I am greatly indebted to Mr. T. Tamaki and his associates, Japanese fishermen operating from Manila southward in the Visayas, for many fine specimens otherwise unobtainable.

Surgeon fishes are excellent food fishes. The flesh is firm without being hard, is flaky, and of very good flavor. Few Americans or Europeans appreciate these fine fishes, and the well-to-do Tagalogs are ignorant of their good qualities. They therefore bring a very low price and are bought by the poorest people. Many much poorer fish sell for much more. They can be cooked with or without the skin, but it should always be removed before the fish is served.

A good-sized surgeon or nose fish cooked as follows is a dish worthy of any occasion:

1 onion, 1 green pepper, 1 ripe tomato. Chop fine, add 1 teaspoonful salt and ½ teaspoonful white pepper. Add 1 cup water, 2 tablespoonfuls butter, Crisco, or other fat, 1 tablespoonful of flour.

Clean and skin the fish, remove head and gills. Lay in pan and place dressing on top. Bake twenty-five minutes in a hot oven, or thirty minutes if the fish is a very large one. Slip from baking pan upon a hot platter without disturbing the dressing, pour any gravy over it, and serve.

Key to the Philippine genera of Acanthuridæ.

a^1. A single movable spine on each side of tail.
  b^1. Dorsal spines 9, rarely 8.
    c^1. Teeth truncate or pointed, mostly fixed, never all movable.
      d^1. Ventrals I–5 ..... **Acanthurus.**
      d^2. Ventrals I–3 ..... **Paracanthurus.**
    c^2. Teeth elongate, setiform, freely movable, the tips dilated on one side ..... **Ctenochaetus.**
  b^2. Dorsal spines 4 or 5; soft dorsal and anal high to very high. **Zebrasoma.**
a^2. Each side of caudal peduncle with one or more bony plates, usually bearing a sharp knifelike keel ..... **Naso.**

Genus ACANTHURUS Forskål

Acanthurus Forskål, Descrip. Anim. (1775) 59.

Vernacular names.—English, lancet fish, surgeon fish, tang; Tagalog, *indangan, labahita, samaral;* Samal and Tao Sug, *indangan, kumay, salias, dorong;* Visayan, *indangan, mungit.*

Dorsal IX– (rarely VIII–) 20 to 32; anal III– (in one species II–) 20 to 29; ventral I–5.

This genus includes those Acanthuridæ in which each side of tail is armed with a sharp movable needlelike or lancetlike spine, directed forward and fitted into a groove in the caudal peduncle; the mouth is very small, each jaw with a single row of lobate or denticulate, truncate or pointed incisors which are sometimes movable, and are usually set diagonally and are more or less imbricate; the spinous part of the dorsal is less developed than the rayed portion.

Body laterally compressed, often much flattened, elongate or deep, and covered with small to minute ctenoid or spinescent scales; pseudobranchiæ well developed; branchiostegals 5; air bladder large, forked posteriorly; the intestine has several large folds; pyloric appendages; vertebræ 9 (rarely 8) + 13.

This genus, found in all tropical seas, shares with its closest relatives the possession of the characteristic sharp caudal spine, which is indeed a frightful weapon. In using it the fish strikes sideways, its lancet held erect at right angles to the body. The lancet fishes abound around coral reefs, moving about in schools and grazing upon marine algæ. Most of the species are dull-colored, uniformly brown, or marked by fine blue dots and lines, or with more or less yellow. Some however are very gaudily marked.

Key to the Philippine species of Acanthurus.

a^1. Body and head pale, with black crossbars..... **A. triostegus.**
a^2. No black crossbars.
  b^1. A yellow, scarlet, or black stripe or mark on shoulder or above upper angle of gill opening.
    c^1. A circular bluish black spot or ring behind eye above gill opening; sides with many fine blue longitudinal lines..... **A. bariene.**
    c^2. A longitudinal bar on shoulder.
      d^1. Shoulder bar black; a narrow black pointed bar from caudal spine to middle of body..... **A. gahm.**
      d^2. Shoulder bar orange or yellow, broadly margined with black. **A. olivaceus.**
  b^2. No spot or longitudinal stripe or bar on shoulder.
    e^1. A whitish or bluish ring around the mouth or lower jaw.

f^1. A large naked red, yellow, or white rhombic or ovate spot on posterior part of trunk, including caudal spine..... **A. achilles.**

f^2. No large colored spot posteriorly on side of trunk.

g^1. A large crescentic pearly spot beneath eye; a white line at base of dorsal and anal, orange posteriorly and widening almost to top of last rays..... **A. aliala.**

g^2. No crescentic white, pearly, or blue spot under eye.

h^1. Caudal with a wide yellow or orange crossband on posterior margin; opercle margined by a broad black band; nostrils blue or white, conspicuous; a white spot near angle of preopercle; caudal spine black..... **A. celebicus.**

h^2. A broad bluish white band across base of caudal; caudal spine white; a wide bluish band across breast and joined by a band on each side to ring about the mouth. **A. leucocheilus.**

e^2. No whitish or bluish ring around mouth or lower jaw.

i^1. Sides of body with longitudinal lines or stripes.

j^1. Back and sides yellow, the belly pale; 8 to 10 horizontal or slightly oblique blue lines from head to back and caudal fin; each blue line with a broad brown band on each side; 2 or 3 curved blue lines from eye; ground color appears as broad yellow bands..... **A. lineatus.**

j^2. Body not banded and striped as above.

k^1. Body with bluish or pale longitudinal lines or with dots or spots arranged in lengthwise series.

l^1. A black spot in axil of dorsal and anal.

m^1. Uniform brown, the sides with paler or bluish dots, forming irregular longitudinal lines, occurring also on scaled part of vertical fins; no blue stripes on cheeks ..... **A. atramentatus.**

m^2. Reddish brown or dusky brown with blue longitudinal lines on sides; 7 longitudinal blue lines on sides of head, the 3 upper ones crossing snout and uniting with those on other side; a blue band across interorbital ..... **A. bleekeri.**

l^2. No black axillary spot on dorsal and anal. Uniform brown with a broad bright yellow or pale interocular band; many wavy blue or brown longitudinal lines on head, breast, nape, and sides; vertical fins banded with blue and yellow, or uniform brown..... **A. dussumieri.**

k^2. Body uniformly brown or blackish brown, without bluish or pale longitudinal lines or rows of dots.

n^1. A black or chocolate brown spot in axil of dorsal and anal.

o^1. Sides of head and body above pectoral base with small circular whitish or blue spots, axillary spots deep chocolate brown; 11 or 12 teeth on each side of upper jaw ..... **A. marginatus.**

o^2. No spots on sides of head and above pectoral; axillary spots black; 6 teeth on each side of upper jaw. **A. nigroris.**

n^2. No black axillary spot on dorsal and anal.
p^1. A more or less distinct wide pale or whitish band on base of caudal; dorsal and anal with 4 or 5 orange bands alternating with lavender or blue bands, these usually disappearing in alcohol; teeth 9 on each side; depth 1.7 to 1.9 times in length..... **A. matoides.**
p^2. No wide pale or whitish band on caudal base.
q^1. Color black; sides of head and breast blackish brown; a deep brown ring around caudal base; fins black; 8 broad rounded teeth on each side above, 8 or 9 below..... **A. mindorensis.**
q^2. Color dark purplish brown, caudal pale brownish yellow; other fins black or deep chocolate brown; teeth narrow, pointed, 10 on each side above, 12 to 14 below ..... **A. philippinus.**

ACANTHURUS TRIOSTEGUS (Linnæus). Plate 1, fig. 1.

Chaetodon triostegus LINNÆUS, Syst. Nat. ed. 10 1 (1758) 463.
Acanthurus triostegus BLOCH and SCHNEIDER, Syst. Ichth. (1801) 215; CUVIER and VALENCIENNES, Hist. Nat. Poiss. 10 (1835) 144; GÜNTHER, Cat. Fishes 3 (1861) 327; Fische der Sudsee 1 (1875) 108; DAY, Fishes of India (1878) 204, pl. 48, fig. 2.
Hepatus triostegus JORDAN and RICHARDSON, Bull. Bur. Fisheries 27 (1907) (1908) 270.
Harpurus fasciatus FORSTER, Descrip. Anim. ed. Lichtenstein (1844) 216.
Chaetodon zebra LACÉPÈDE, Hist. Nat. Poiss. 3 (1798) pl. 25, fig. 3.
Acanthurus zebra LACÉPÈDE, Hist. Nat. Poiss. 4 (1798) 546, pl. 6, fig. 3.
Teuthis australis GRAY, in King's Survey Coasts Australia 2 (1827) 435.
Acanthurus hirudo J. W. BENNETT, Fishes Ceylon (1834) 11, pl. 11.
Acanthurus subarmatus F. D. BENNETT, Whaling Voyage 2 (1840) 278.

Vernacular names.—Ilocano, *cabcabalan;* Tagalog, *ray tapis.*
Dorsal IX–21 to 24; anal III–19 to 21.

The oblong ovoid body laterally compressed but plump, depth 1.95 to 2 times, head 3 to 3.3 times in length; anterior dorsal profile convex from origin of dorsal to the bulging interorbital, then concave to lips, or upper part of profile may be straight or nearly so, snout concave; ventral profile a uniform arch from chin to caudal peduncle; eye rather small, high up, near profile, 4 to 4.6 times in head, but larger proportionally in young specimens; snout thin, broad tipped, about 1.5 times in head; interorbital broad, rounded, bulging laterally at upper anterior margin of eye, 3 to 3.3 times in head; posterior margin of preopercle very steeply inclined, angle broadly rounded, depth

twice in head; the small terminal mouth very low down, with 7 broad, rounded or blunt, lobate teeth on each side of upper jaw, the denticulations extending laterally nearly to their base; dorsal and anal of moderate height, rounded posteriorly; dorsal spines stout, first very short but not concealed, last twice to 2.3 times in head; dorsal and anal rays equal to or slightly greater than last dorsal spine, decreasing in length at posterior angle; anal spine equals or slightly exceeds last dorsal spine; the thick caudal peduncle somewhat flattened dorsoventrally, its depth 2.87 to 3 times in head; caudal short, with slightly concave posterior margin, 3 to 3.66 times in length; caudal spine very small, half or less than half diameter of eye in length; pectoral 1.1 to 1.2 times in head; ventral broad, 1.35 to 1.55 times in head.

The color in life of specimens from Puerto Galera, Mindoro, was pale greenish above, white below, with six black transverse bands on sides, each about as wide as pupil of eye; a black longitudinal line along middle of snout; the dorsal may be uniform green, or golden may be intermingled with the green; anterior part of dorsal with a narrow black margin.

The color in alcohol varies from cream to gray brown or dark brown, snout and nape darkest; breast, belly, and underside of caudal peduncle cream color; 5 narrow vertical or curved black or blackish brown crossbands, first passing through eye and curving forward below it, second stopping behind pectoral base; a blackish brown spot or bar on base of pectoral; a median band of the same color along snout from interorbital to its tip; a brown bar or saddle, or a spot of the same color on top and side of caudal peduncle and another spot on side near lower margin, the latter spot sometimes disappearing; a dark brown line, disappearing posteriorly, separates the cream-colored undersurface from the brown of the sides; dorsal dark brown to pale brown, darkest anteriorly, or posterior marginal region may be pale or colorless; anal pale cream with a broad brown longitudinal band covering most of it; both dorsal and anal may fade to pale cream; anal dark to pale brown or whitish, with a cream colored or white margin; caudal brown to whitish; pectoral pale yellowish to colorless; ventrals white, suffused with brown, or all gray or white.

Here described from the following specimens, ranging in length from 24 to 150 millimeters.

Paraoir, La Union Province, 1.
Tailon Island, 1.
Iba, Zambales Province, 2.
Nasugbu, Cavite Province, 2.
Puerto Galera, Mindoro, 2.
Calapan, Mindoro, 20.
Balabac, 3.
Tubigan, Sulu Province, 1.
Pearl Bank, Sulu Province, 1.
Guam, 5.

I have also examined specimens from Paoay, Ilocos Norte, and Nasugbu, Batangas, in the collection of the College of Agriculture.

This handsome species was recorded by Jordan and Richardson from Calayan and Fuga Islands of the Babuyanes, and from Cagayancillo in the Sulu Sea. Elsewhere this fish occurs from Ceylon to Guam, and southeast in the tropical Pacific to the Marquesas. The very closely related *A. sandvicensis* (Streets) is found from the Hawaiian Islands to the offshore islands of Mexico.

ACANTHURUS BARIENE Lesson. Plate 1, fig. 2.

Acanthurus bariene LESSON, Voy. Coquille, Zool. 2 (1830) 150.
Acanthurus nummifer CUVIER and VALENCIENNES, Hist. Nat. Poiss. 10 (1835) 172; GÜNTHER, Cat. Fishes 3 (1861) 338.

Dorsal IX–26; anal III–24.

The depth of the broadly ovoid compressed body 1.94 to 2 times in its length, deepest between ventrals and anal, the depth diminishing rapidly toward caudal peduncle; nape compressed, elevated, anterior dorsal profile very strongly convex; with age the snout may become protuberant and overhang the mouth; ventral profile deeply and evenly arched from isthmus below chin to caudal peduncle; head set diagonally, 3.5 to 3.88 times in length; the eye varies much with age, 3.85 to 4.5 times in head and 2.86 to 3.93 times in the large deep snout which has its greatest bulge below level of eye and is 1.16 to 1.38 times in head; the broad and more or less elevated interorbital space 3 to 3.85 times in head; the inferior mouth projects diagonally downward, with large tumid lips; 10 teeth on each side of upper jaw, 11 in lower jaw; upper teeth broadly pointed, and denticulate back upon sides some distance; the very short first dorsal spine entirely concealed in thick skin, and all the spines slender and comparatively weak, with only their tips exposed, the last one 1.38 to 1.7 times in head; dorsal rays equal to or a fifth higher than the spines, posterior angle of fin pointed; anal resembles dorsal, third spine 2 to 2.2 times in head, anal rays as high as

last dorsal spine, posterior angle with an elongate sharp tip; pectoral and ventrals a little more or less than head; depth of caudal peduncle 2.3 to 2.6 times in head; caudal deeply lunate with very long attenuate pointed tips of about equal length, 1.9 to 1.95 times in head; caudal spine large, thick, sharp-pointed both anteriorly and behind, pale or colorless, 2.5 to 3 times in head.

Fresh specimens were brown, with many fine wavy longitudinal blue striæ on sides, golden spots and short vermiculated lines on cheeks, and a more or less circular blue-black spot behind eye above gill opening; the dorsal was golden, except the last 5 rays which were dark violet, with 4 or 5 diagonally longitudinal violet-blue lines near margin; the anal was brown like the body, violet-blue posteriorly, with 3 longitudinal blue lines on outer portion and a marginal sky blue band; both dorsal and anal with a sky blue band along base; the caudal was bluish dusky posteriorly, with golden brown spots on lobes; the pectoral was brown basally, the rest blue-black, fading into brown marginally, with a yellow transverse bar near extremity; the ventrals were brown basally, the outer two-thirds blue-black; the caudal spine was in a blue-black spot.

Color in alcohol uniformly dark brown to blackish brown, posterior half darkest, with very many fine blue longitudinal lines, or the region above pectoral may be more or less suffused with yellowish; above upper end of gill opening and directly behind eye is a circular violet-black spot, smaller than eye, and fading in the smaller specimens; vertical fins darker than body, or dorsal may be more or less yellow; below base of dorsal is a violet-black band, broadest anteriorly and tapering back to a line which disappears about halfway to caudal; above it is a light blue line running the whole length of base; there are three longitudinal blackish violet lines along margin of dorsal, the outer one broadest; the anal has a basal and a marginal violet or blue longitudinal line; caudal shows traces of a pale basal ring; upper and lower margins of caudal brown to light brown, the lobes more or less barred or spotted, the central portion darker, becoming violet-brown to violet-black posteriorly; pectoral blackish, with a lemon yellow transverse bar near outer extremity, the bar prone to disappear in alcohol; ventrals blackish violet. In life there was evidently a broad blue band on chin. The caudal spine has a blackish brown sheath in larger specimens, a white sheath in the smaller specimens.

Here described from four specimens, 218 to 280 millimeters in length; three from Ibajay, Capiz Province, Panay, and one

from Tablas. I have also studied three very fine specimens from Ambil Island, 280 to 345 millimeters in length, and one, 310 millimeters long, from Maricaban Island. I place here a specimen, 240 millimeters long, from Bantayan Island. Instead of a black shoulder spot it has a violet-black line encircling an area on the shoulder more than twice the size of eye; the caudal has a wide bluish white ring on its base, the whole central part of fin black; the caudal spine is in a deep black spot. The shoulder mark on this specimen is much like that described for *Acanthurus tennenti* Günther.

This fish is abundant on rocky reefs in the central Visayas. The species is unique and has hitherto been known only from the type specimen, collected by Garnot at Waigiou, about 1824, and described first by Lesson, later by Valenciennes. The discovery of this fish in abundance in the Philippines constitutes one more link in the chain which binds so firmly together the Moluccas, northwestern New Guinea, and the Philippines, at least so far as their reef-dwelling fishes are concerned.

ACANTHURUS GAHM (Forskål). Plate 12, fig. 2.

Chaetodon gahm FORSKÅL, Descrip. Anim. (1775) 64.

Acanthurus gahm CUVIER and VALENCIENNES, Hist. Nat. Poiss. 10 (1835) 160; RÜPPELL, Atlas Fische (1828) 58; GÜNTHER, Cat. Fishes 3 (1861) 338; Fische der Südsee 1 (1873) 113, pl. 74; WEBER, Fische, Siboga Exp. (1913) 318.

Dorsal IX–25; anal III–23 to 24.

The oblong body is deepest before anal fin, much compressed laterally, anterior profile convex to very boldly convex, snout becoming vertical or even protuberant and overhanging mouth, depth twice, head 3.5 to 3.7 times in length; the long snout varies much in contour, becoming more and more curved in age, 1.25 to 1.4 times in head; the eye varies much in size, 3.7 to 4.6 times in head, 2.9 to 3.4 times in snout; interorbital may be broad and relatively low, or elevated and more appressed, 2.8 to 2.2 times in head; posterior margin of preopercle steeply inclined, the broadly rounded angle beneath anterior margin of eye or posterior or anterior nostril, its depth 1.6 to 1.7 times in head; mouth small, low, distinctly inferior, opening obliquely downward, with 9 teeth on each side in upper jaw, the denticulations on their tips extending up the sides for half their length; 10 teeth on each side in lower jaw; first dorsal spine very short, entirely concealed, second spine almost entirely concealed by thick skin; none of the spines strong, the last one 1.77 times in head; dorsal not high, angulate posteriorly, the rays

a trifle higher than the spines; third anal spine 2.2 to 2.3 times in head; the anal is like the dorsal in shape but the rays are a little lower, and the posterior angle is more acute and longer; pectoral equal to or a little more or less than head; ventrals pointed, the first ray in old specimens elongate and with a somewhat filiform tip, equal to or a trifle shorter than head; depth of caudal peduncle 2.4 to 2.5 times in head; caudal deeply lunate, with elongate, sharp-pointed tips, the upper a little the longer, 1.95 to 2.1 times in length; the broad acutely pointed caudal spine has a short projection backward, 4.36 to 4 times in head.

A living specimen in the Bureau of Science aquarium is grayish blue, brownish gray, or dusky brownish, according to light conditions and the state of its excitement, with a broad white band at caudal base and on caudal peduncle, and a dull blue spot on nape before origin of first dorsal; a broad black bar extends back from eye above anterior half of pectoral and a very narrow, elongate, triangulate, pointed black stripe extends forward from the black caudal spine, halfway to tip of pectoral; lips bluish white, posterior margin of opercle black; dorsal yellowish orange, anal brownish orange, each with a dark blue band along base, margin of anal vivid blue; caudal pale gray in strong light, dusky slate blue in dim light, with a broad bluish white band along its posterior margin, its upper and lower margins deep blue; pectoral blackish, with a broad lemon yellow crossbar posteriorly, its posterior margin clear.

Color in alcohol deep brown to blackish brown, the vertical fins concolorous or darker, with a black longitudinal bar on shoulder, beginning a little behind eye and running back as far as above middle or posterior third of pectoral, broadest posteriorly; from the black caudal spine an elongate, narrow, black, triangulate, pointed bar extends forward halfway to pectoral; this is absent in specimens 100 millimeters or less in length; in some specimens the dorsal is more or less yellow on the basal anterior half; the dorsal has a black marginal line, the anal a narrow blue or black margin; the caudal has a posterior white margin, within which is a black crescentic bar; some large specimens show a broad white ring or crossbar on caudal base; the pectoral has a broad posterior yellow margin, fading to pale or colorless; some specimens have a white or pale spot on anterior margin of eye, and some have the body more or less yellowish above pectoral.

Here described from 10 specimens, varying in length from 92 to 210 millimeters, from the following localities:

Tablas, 1.	Basbas Island, Sulu Province, 1.
Bantayan, 2.	Bungau, Sulu Province, 1.
Samal Island, Davao Gulf, 1.	Clarendon Bay, Balabac, 4.

This species is common in the central and southern Philippines; it occurs elsewhere from the Red Sea to the Gilbert Islands and southward to Samoa, the Society, and the Paumotu Islands.

ACANTHURUS OLIVACEUS Bloch and Schneider. Plate 12, fig. 1.

Acanthurus olivaceus BLOCH and SCHNEIDER, Syst. Ichth. (1801) 213; GÜNTHER, Cat. Fishes 3 (1861) 336; Fische der Südsee 1 (1875) 113.

Teuthis olivaceus JORDAN and EVERMANN, Proc. U. S. Nat. Mus. 25 (1903) 358, fig. 23; Bull. U. S. Fish Comm. 23[1] (1903) (1905) 385, fig. 166.

Hepatus olivaceus JORDAN and RICHARDSON, Bull. Bur. Fisheries 27 (1907) (1908) 270.

Acanthurus eparai LESSON, Voy. Coquille, Zool. 2 (1830) 147; Atlas (1826) Poissons, pl. 27, fig. 1.

Acanthurus humeralis CUVIER and VALENCIENNES, Hist. Nat. Poiss. 10 (1835) 170; EYDOUX and SOULEYET, Voy. Bonite 1 (1849) 169, pl. 2.

Harpurus paroticus FORSTER, Descrip. Anim. ed. Lichtenstein (1844) 183.

Dorsal IX–22 to 23; anal III–21 to 23.

Body oblong ellipsoid, compressed laterally but rather thick, depth 2 to 2.3 times, head 3.5 to 3.7 times in length; the anterior dorsal profile varies from a boldly convex arc to an irregular sinuous curve which is almost vertical on front of snout; the nape and especially the snout are laterally compressed, the snout sometimes so strongly projecting as to be almost protuberant and the profile concave above eyes; snout 1.33 to 1.44 times in head; eye rather small, about 4.75 times in head and 3.3 to 3.5 times in snout; interorbital about 3.25 times in head; posterior margin of preopercle inclined at about 45°, the angle obtusely rounded, the depth 1.7 to 1.8 times in head; mouth very low, with protuberant lips, and 8 or 9 teeth on each side of upper jaw, their broad tips lobulate-denticulate and the sides denticulate for half their length; the anterior nostril has a thin low membranous tubule becoming a high flap at rear; posterior nostril much smaller, with a thin low membranous margin except at rear; first dorsal spine low, its tip not embedded in skin, last spine twice in head; dorsal rays a little higher than

the longest spine, those at posterior angle about a fifth longer and forming a long-tipped pointed angle; third anal spine 2.66 to 2.7 times in head; anal like dorsal but lower, but sometimes the long-pointed rays of posterior angle are equal to dorsal; the broad pectoral a little shorter than head; the pointed ventral three-fourths to five-sixths the length of head; depth of the stout caudal peduncle 2.6 to 2.7 in head; caudal lunate with very long, narrow, almost filiform tips, 1.7 to 2 times in length; the stout knifelike caudal spine has a long sharp posterior point, 2.6 to 2.7 times in head.

Color in life dark olive brown, with a broad, bright, deep yellow or orange bar, broadly margined with black or dark brown, beginning as a circular spot on opercle at angle and running back horizontally along side to middle of body; the dark margin of shoulder bar is broadest posteriorly and does not merge into the body color; posterior part of pectoral whitish or with a broad yellow margin, the rest of fin very dark brown; a broad milk white crescent on posterior margin of caudal, very narrowly edged with black, the elongate caudal lobes pale brown spotted with dark brown; caudal spine covered with a very dark brown sheath, its groove edged with blackish.

Color in alcohol similar, the shoulder bar often fading to pale buff or whitish and the yellow on pectoral largely disappearing; dorsal and anal much darker brown than body, or blackish.

In some fresh specimens the shoulder bar is scarlet or some shade of red.

Here described from six specimens, 165 to 230 millimeters in length, from the following localities:

Subic Bay, Olongapo, Zambales Province, 1.
Ambil Island, 2.
Agutaya Island, Cuyo Islands, 2.
Jolo, Sulu Province, 1.

This very distinct species does not seem to be abundant with us, but the Japanese fishermen have recently begun to catch a good many among the Cuyo Islands. Jordan and Richardson had a specimen from Cagayancillo, in the Sulu Sea.

It is widely distributed in the Pacific Ocean, from Formosa to Tahiti. It is common in the Caroline and Hawaiian Islands. In the East Indies it is known from Celebes and the Moluccas.

ACANTHURUS ACHILLES Shaw. Plate 2, fig. 1.

Acanthurus achilles SHAW, Gen. Zool. 4 (1803) 383; CUVIER and VALENCIENNES, Hist. Nat. Poiss. 10 (1835) 160; GÜNTHER, Cat. Fishes 3 (1861) 340; Fische der Südsee 1 (1873) 115, pl. 71, fig. B; STEINDACHNER, Denkschr. Akad. Wiss. Wien. 70 (1900) 493.

Teuthis achilles FOWLER, Proc. Acad. Nat. Sci. Phila. (1900) 513. *Hepatus achilles* JORDAN and EVERMANN, Bull. U. S. Fish Comm. 23[1] (1903) (1905) 384, pl. 58; JORDAN and SEALE, Bull. Bur. Fisheries 25 (1905) (1906) 350; STEINDACHNER, Sitzungsb. Kais. Akad. Wiss. 115[1] (1906) 1393.

Dorsal IX–31; anal II–27.

Body very broadly ovoid, very much laterally compressed, greatest depth 1.5 times in length; head placed obliquely, twice in depth, three times in length, its upper profile strongly convex to below eyes; snout moderately concave, a little more than 1.4 times in head; eye high up, circular, $2\frac{1}{3}$ times in snout, $3\frac{1}{3}$ times in head, and 1.1 times in the slightly ridged interorbital; posterior margin of preopercle begins beneath posterior margin of eye and descends very steeply; angle of preopercle 1.76 times in head; the small mouth low, terminal, with equal jaws, and but 4 broad, blunt, irregularly lobate teeth on each side of upper jaw; dorsal and anal alike in shape, of moderate height, the dorsal spines graduated in length to the last, which is highest; first dorsal spine not concealed, 7.5 times in head, the last one 1.57 times in head; anterior dorsal rays a trifle higher than last spine, 1.5 times in head, the posterior rays rapidly shortened; second anal spine 3.75 times in head; first anal ray stout, coarse, spinelike in appearance; the middle anal rays equal the longest dorsal rays in height; caudal peduncle much compressed laterally, its depth 2.72 times in head; caudal lunate, with elongate tips, the upper the longer, its length 1.2 times head; pectoral a tenth longer than head; the pointed ventral 1.2 times in length of head; caudal spine needle-pointed, a little shorter than eye.

Color in alcohol uniform chocolate brown, with a large ovate or rhombic naked white spot on posterior part of trunk, including caudal spine; a blue line at base of dorsal rays; above it is a wider tan or pale brown stripe, widest posteriorly, and a similar one at base of anal rays; a blue line from one angle of mouth to the other, encircling chin; the membranous posterior flap of opercle creamy white; basal portion of caudal blackish brown, then pale brown, then a blackish brown crescent followed by a broad marginal whitish crescent; outer margin of ventral blue, rest of fin blackish brown.

Here described from a specimen, 92 millimeters long, from Guam. In life this is a brilliantly colored fish. The patch on the side is bright scarlet or orange. The submarginal crescent on caudal is of the same color, and the anal stripe and upper stripe on dorsal base are likewise scarlet or orange.

This beautiful fish ranges from the China Sea to Hawaii and Samoa. It reaches a length of 230 millimeters.

I have seen no specimen from the Philippines, but there is no question of its occurrence here.

ACANTHURUS ALIALA Lesson. Plate 2, fig. 2.

Acanthurus aliala LESSON, Voy. Coquille, Zool. 2 (1830) 150.

Teuthis aliala JORDAN and EVERMANN, Fishes North America 2 (1898) 1693; SEALE, Occ. Papers Bishop Mus. 1 (1901) 109.

Hepatus aliala JORDAN and SEALE, Bull. Bur. Fisheries 25 (1905) (1906) 350.

Acanthurus glaucopareius CUVIER and VALENCIENNES, Hist. Nat. Poiss. 10 (1835) 139; KITTLITZ, Mus. Senckenb. 1 (1834) 192, pl. 13, fig. 3; BLEEKER, Acta Soc. Sci. Indo-Neerl. 1 (1856) Beschriv. Vischsoorten Amboina, 47; GÜNTHER, Cat. Fishes 3 (1861) 339; Fische der Südsee 1 (1873) 114, pl. 71, fig. A.

Dorsal IX–28 or 29; anal III–25 or 26.

Depth of the short, strongly compressed, ovate body 1.7 to 1.76 times, head 3.4 to 3.6 times in length; anterior dorsal profile strongly convex from origin of dorsal to below eye, then concave to tip of snout; head small, very oblique, its length twice in depth; the large circular eye 2.75 to 2.9 times in head, 2 to 2.16 times in snout, which is much compressed laterally and 1.25 to 1.35 times in head; the broad, rounded, projecting interorbital equals eye; posterior margin of preopercle very steeply inclined, the angle broadly rounded with no perceptible lower limb, its depth 1.7 to 1.8 times in head; mouth very small, downward projecting, with 5 short broad teeth on each side of upper jaw, their truncate margin lobate denticulate; dorsal and anal rather low, rounded posteriorly, the very short first dorsal spine not concealed; dorsal spines moderately strong, the last one about two-thirds as long as head, anterior and middle dorsal rays about the same height; third anal spine and anal rays a little lower than dorsal rays; pectoral a little longer than head; ventrals short with a broad rounded tip, 1.33 to 1.5 times in head; depth of the short thick caudal peduncle 2.35 to 2.5 times in head; the short broad caudal 3.25 to 3.3 times in length, its posterior margin almost truncate or gently concave, without elongate marginal lobes; the knifelike caudal spine almost equal to eye, with a short projecting posterior point.

Color in alcohol purplish or brownish black, with a large crescentic or subcrescentic violet pearly spot under and anterior to eye; a pearly or bluish pearly ring around mouth, not continuous above; base of dorsal and anal each with a white line which broadens into a wide orange bar posteriorly, extending

nearly to top of last rays; remainder of vertical fins purplish black; caudal pale with a yellow crossbar posteriorly, the hind margin of which is a black line, and beyond this a broad terminal purplish brown band; pectoral blackish; ventrals black, the outer margin a blue line; caudal spine greenish, with a whitish sheath.

Here described from two specimens, 119 and 120 millimeters long, collected on the reef at New Washington, Capiz Province, Panay.

This easily recognized species occurs from the Moluccas to the islands off the western coast of Mexico. It ranges north to Guam and southeast to the Society Islands.

ACANTHURUS CELEBICUS Bleeker. Plate 13, fig. 1.

Acanthurus celebicus BLEEKER, Nat. Tijd. Ned. Ind. 3 (1852) 761; GÜNTHER, Cat. Fishes 3 (1861) 339; Fische der Südsee 1 (1875) 115, pl. 73, fig. B.

Dorsal VIII–27; anal III–25.

The ovoid body much compressed laterally, greatest depth just before anal, 1.77 times in length; the obliquely placed head 3.48 times in length; anterior dorsal profile strongly convex from dorsal to lower level of eye, then concave to tip of snout; the elongate, depressed, pointed snout 4.39 times in head; eye near profile line, 3.6 times in head and almost 3 times in snout; interorbital broad, low, 2.9 times in head, a fourth wider than eye; posterior edge of preopercle inclined about 45°, the angle rounded, obtuse, the depth 1.8 times in head, 1.43 times in snout; mouth small, low, jaws protuberant, 7 obliquely set and laterally imbricate teeth on each side of upper jaw, their round pointed tips denticulate back for about half their length; in lower jaw are 8 larger, broader teeth similarly arranged, their tips wide and irregularly denticulate; dorsal spines short, moderately stout, tip of first one visible, the last one about 5 times in length and almost 1.5 times in head; the dorsal rays are higher and gradually increase in length posteriorly, forming a large broad point at angle, the longest rays 1.1 times in head; anal similar to dorsal in shape, the posterior angle more sharply pointed and extending farther back than the dorsal point; third anal spine 1.8 times in head; the longest anal rays a trifle shorter than the dorsal rays; the broad caudal very slightly lunate, upper margin produced posteriorly into a short sharp-pointed lobe, 2.66 times in length; caudal peduncle 2.23 times in head; caudal spine short, sharp-pointed, 5.8 times in head;

pectoral longer than head, 2.88 times in length; ventrals pointed but not elongate, 1.1 times in head.

Color in alcohol dull violet-brown, darkening toward caudal peduncle, and blackish brown on sides of head; margin of opercle purplish black; lips black, with a white ring starting on upper lip and encircling chin, its color partly suffused with violet; a white spot on preopercle, near its posterior angle; dorsal and anal violaceous black; caudal blackish centrally, with a yellowish crossband forming posterior margin; base of pectoral blackish brown, rest of fin pale, evidently yellow or reddish yellow in life; ventrals violet-brown to violet-black; the white nostrils conspicuous.

Here described from a specimen, 101 millimeters long, from Calapan, Mindoro. This rare and easily recognized species was originally described by Bleeker from a specimen collected at Macassar, Celebes. He later recorded it from Ternate, Amboina, and New Guinea. The British Museum has specimens from the Solomon Islands and Tahiti.

According to Bleeker and Günther, the fin formula is D. VIII or IX–26 or 25; anal III–24.

Since writing the above I have obtained two living specimens from Calapan, Mindoro; the larger one is shown in the colored plate. The amount and intensity of red color behind the head and about the pectoral base vary considerably, according to the light conditions and the state of excitement of the fish. A much smaller specimen is greenish gray anteriorly, the posterior third darker, becoming blackish slaty blue, or in certain lights brownish, sides of head slaty blue, a dusky patch above eye, the mouth encircled by a whitish ring, and a whitish spot near posterior angle of preopercle; the adjacent margin of breast whitish blue; nostrils in a patch of whitish blue and a spot of the same color on lower part of eye; posterior margin of opercle black; behind opercle a blackish red patch extending down to root of pectoral; dorsal and anal dull bluish slate anteriorly, darker posteriorly, the posterior half of both fins with a narrow yellow margin; posterior end of caudal peduncle and central part of caudal blackish; a band of light yellow across posterior margin of caudal, edged posteriorly with a blue line; a stripe of light yellow along lower margin and posterior half of upper margin of caudal; pectoral very pale yellow, ventral dull blue slate.

ACANTHURUS LEUCOCHEILUS Herre, sp. nov. Plate 12, fig. 3.

Dorsal IX–24 or 25; anal III–23.

The depth of the strongly compressed, ovate body about 2 to 2.4 times in length, the greatest depth at origin of anal; the head varies from 3.3 to 3.7 times in length; the dorsal and anterior profile of head varies considerably; it may be a steeply convex uniform curve from dorsal to below eyes, then nearly vertical to upper lip, and lips and mouth projecting, or the snout may be very convex and humplike below eyes and above mouth; the laterally appressed snout 1.3 to 1.44 times in head; eye placed high up, 3.6 to 3.9 times in head, 2.7 to 2.75 times in snout, and 1.07 to 1.28 times in the low, convex interorbital; posterior margin of preopercle begins at or below level of eye and descends very steeply, its broadly rounded angle before a perpendicular from front margin of eye, depth of preopercle 1.8 times in head; mouth very low down, with full projecting lips and protruding teeth; 9 or 10 teeth with broad lobate tips on each side of upper jaw and 10 or 11 similar teeth on each side of lower jaw; dorsal and anal of approximately equal moderate height, angulate posteriorly, first dorsal spine very small; both first and second spines concealed by a covering of thick skin, the spines increasing in length to the ninth, which is 1.68 to 1.87 times in head; the soft dorsal approximately equals the longest spine in height; first anal spine concealed, third 2.4 times in head; caudal deeply lunate with long pointed tips, 2.3 times in length, or tips elongated and ribbonlike, when the fin may be 1.5 times in length; depth of caudal peduncle 2.6 to 3.1 times in head; pectoral approximately equal to head; first ventral ray elongated, with threadlike tip, 1.1 to 1.25 times in head; the knifelike spine has a long sharp point anteriorly and a pointed posterior process, equal to or half again as long as eye.

Color in alcohol uniform blackish brown; snout just above and behind lips black; a broad bluish pearly or pearly white band encircles mouth, or may be only partially developed on upper lip; a similar wide band crosses breast from before anterior angle of gill opening to opposite side and is joined by a band on each side to the ring about mouth; a broad bluish white band encircles base of caudal; pectoral black with a bright yellow transverse bar on posterior margin, which later faded to white; dorsal, anal, and ventral black or brownish

black; central part of caudal, back to posterior margin, black, or sometimes with a bluish white lunate band near posterior margin; caudal spine white, its groove with a narrow black margin.

Here described from three specimens, 175 to 200 millimeters long, from Bantayan Island, and a specimen, 196 millimeters long, from Cebu.

A fresh specimen, 186 millimeters long, from Agutaya, one of the Cuyo Islands, was blackish brown above, deep brown elsewhere except cheeks and snout which were reddish brown; lips reddish with a broad bluish white band around mouth, and a wider blackish brown band behind it; a broad bluish white band beginning in front of anterior angle of gill opening and crossing breast to opposite side; a wide bluish white band around caudal base; dorsal and anal were dark brown, the soft dorsal with 3, the anal with 2 dark red lines near margin, alternating with bluish, and a narrow sky blue marginal line; posterior margin of both fins brick red; a deep black line below dorsal base; the caudal was very dark brown with a broad submarginal blue band, posterior edge black, upper and lower margin blue; the pectoral was blackish brown with a bright yellow tranverse bar on posterior third and a broad dusky posterior margin in which the membranes were clear but the rays black; the ventrals were blackish basally and along outer margin, the rest brick red.

λευκος, white; χειλος, lip.

ACANTHURUS LINEATUS (Gmelin). Plate 14, fig. 1.

Chaetodon lineatus GMELIN, Syst. Nat. 1 (1789) 1246.

Acanthurus lineatus BLOCH and SCHNEIDER, Syst. Ichth. (1801) 214, pl. 49; CUVIER and VALENCIENNES, Hist. Nat. Poiss. 10 (1835) 164; GÜNTHER, Cat. Fishes 3 (1861) 333; Fische der Südsee 1 (1873) 111, pl. 70; DAY, Fishes of India (1875) 203; WEBER, Fische Siboga Exp. (1913) 317.

Acanthurus vittatus BENNETT, Fishes Ceylon (1834) 2, pl. 2.

Hepatus lineatus JORDAN and SEALE, Bull. Bur. Fisheries 25 (1905) (1906) 351; JORDAN and RICHARDSON, Bull. Bur. Fisheries 27 (1907) (1908) 270.

Teuthis lineatus SEALE, Occ. Papers Bishop Museum 1 (1901) 108.

Dorsal IX–26 or 27; anal III–25 to 27.

The compressed body elongate ovoid, depth 2 or 2.1 times, head 3.7 to 3.95 times in length; anterior dorsal profile boldly convex, nape appressed and somewhat ridged, snout long, steeply declivitous, 1.3 to 1.4 times in head; eye rather small, 4 to 4.5 times in head and about 3 times in snout; the broad high interorbital 2.85 times in head; mouth very low, with 6 broad lobate

teeth on each side of upper jaw; first dorsal spine very short but not concealed, all the spines rather weak, the last one about 1.66 times in head; the rays about as high except those at posterior angle, which are a little more elongate; third anal spine 2.35 to 2.4 times in head, the rays a little lower than dorsal, of similar outline but more sharply angulate posteriorly; pectoral and ventral a little longer than head, ventral with an elongate pointed tip; depth of caudal peduncle twice or about twice in head; caudal spine elongate, deep and shaped like a knife blade, with a short posterior point, 1.9 to 2 times in head; caudal deeply lunate with elongate tips, equal in length or upper one slightly longer, 2.3 to 2.4 times in length.

This beautiful and vividly colored fish is the gorgeous one in a family which is mostly plain colored. The ground color is yellow, the belly blue, with eight to ten blue lines running horizontally or slightly obliquely from cheek or eye to base of caudal and the back; each blue line has a brown band on each side, as wide as the yellow stripes of the ground color between; from anterior margin of eye two similar bands curve forward down snout and around cheek to pectoral base; another goes from anterior dorsal base forward to interorbital where it joins its fellow and forms a median line on snout; some of the lines run out upon posterior part of soft dorsal, rest of fin brown with a black marginal line; 2 or 3 vertical blue lines with brown margins at base of caudal, its anterior half dark brown or blackish brown, posterior half with a broad paler lunate portion, the two colors separated by a curved blue line; pectoral brown at base, sometimes with blue lines transversely, the outer half yellow or paler; ventrals yellow or orange, with the outer part deep blue, usually fading to blackish or dark brown in alcohol; in my specimens the anal is bluish, in some blackish brown with a pale blue marginal line, the base always more or less orange.

No two specimens are exactly alike in color, and there is a wide variation in the arrangement of the stripes of color. The stripes on the body may curve up and back upon the dorsal fin, and the anterior part of the dorsal may be longitudinally barred.

Here described from the following specimens, ranging from 50 to 175 millimeters in length:

Paraoir, La Union Province, 2.
Southern coast of Batangas Province, 1.
Manila, 1.
Sibutu, Sulu Province, 1.
Guam, 1.

Since writing the above I have received a specimen, only 35 millimeters long, from Paoay, Ilocos Norte.

Günther had a specimen labeled "Philippine Islands," and Jordan and Richardson had one from Cagayancillo. This species occurs throughout the East Indies and Polynesia to Tahiti; northward it is not known beyond Guam. In the Indian Ocean it is known from the Andamans, Ceylon, and Zanzibar.

ACANTHURUS ATRAMENTATUS (Jordan and Evermann). Plate 3, fig. 1.

Teuthis atramentatus (by misprint *atrimentatus*) JORDAN and EVERMANN, Bull. U. S. Fish Comm. 22 (1902) (1903) 198; SNYDER, Bull. U. S. Fish Comm. 22 (1902) (1903) 533; HERRE, Fishes of Marcus Island, Occ. Papers Bishop Mus. 2 (1903) 133.

Hepatus atramentatus JORDAN and EVERMANN, Bull. U. S. Fish Comm. 23[1] (1903) (1905) 393, fig. 171; poor figure.

Acanthurus lineolatus GÜNTHER, Cat. Fishes 3 (1861) 366; Fische der Südsee 1 (1875) 112, pl. 73, fig. A; excellent figure; STEINDACHNER, Denkschr. Ak. Wiss. Wien 70 (1900) 493.

Dorsal IX–24 or 25; anal III–23.

The depth is twice, the oblique head 3.45 to 3.7 times in length; body broadly ovoid, strongly compressed laterally, the greatest depth just before origin of ventrals, anterior profile convex from dorsal to below eyes, snout slightly concave; the small mouth low, with 6 teeth on each side of upper jaw; the elongate snout 1.4 to 1.5 times in head; eye 3.4 to 3.7 times in head, 2.5 to 2.6 times in snout; interorbital space rather broad, rounded, moderately low, 2.8 to 3.3 times in head; posterior margin of preopercle oblique, inclined about 45°, the angle beneath or in advance of anterior margin of eye, its depth 2 or 2.1 times in head; opercular margin steeply rounded, nowhere angulate; nostrils close together, the anterior one with a large membranous flap on its posterior margin, the posterior nostril with a more or less evident thin marginal membrane; first dorsal spine very low, concealed in thick skin, the last one longest, 1.7 times in head; anterior dorsal rays a trifle more or less in length than posterior dorsal spine; soft dorsal and anal similar in shape, the fins angulate posteriorly; third anal spine 1.9 to 2.25 times in head, anal rays a little lower than dorsal rays; pectoral a little longer than head; first ventral ray attenuate, equal to head; caudal lunate, upper lobe elongate, running to a sharp point, much longer than head, 2.5 to 2.75 times in length; caudal spine slender, very long pointed, 2.8 to 3.4 times in head.

Color in alcohol uniform brown, the sides dotted with paler, the dots forming irregular longitudinal lines which occur also

on the scaled part of vertical fins; dorsal and anal brown to dark brown, with a more or less evident blackish marginal line; pectoral pale brown; caudal paler posteriorly, with a white marginal line; a conspicuous black spot in axil of dorsal and anal. In life the pale dots and lines are blue.

Here described from a specimen, 117 millimeters long, from Sitankai, and two specimens, 104 and 107 millimeters in length, from Puerto Galera, Mindoro. The Bureau of Science collection contains a specimen, 98 millimeters long, collected by me at Sialat Point, Catanduanes. This species is common in the Hawaiian Islands, and ranges throughout the tropical Pacific from Marcus Island to the Samoan and Society Islands.

ACANTHURUS BLEEKERI Günther. Plate 14, fig. 2.

Acanthurus bleekeri GÜNTHER, Cat. Fishes 3 (1861) 335; BLEEKER, Ned. Tijd. Dierk. 1 (1863) 156; KLUNZINGER, Fische des Rothen Meeres (1884) 85; WEBER, Fische Siboga Exp. (1913) 318.

Acanthurus mata BLEEKER, Nat. Tijd. Ned. Ind. 7 (1854) 432; not of Cuvier and Valenciennes.

Dorsal IX, 24 or 25; anal III, 22 to 24.

The ovoid body strongly compressed laterally, broad anteriorly and tapering strongly toward caudal peduncle, its dorsal and ventral outlines alike, its depth 2.2 to 2.26 times, the short blunt head 3.8 times in length, its depth a fifth or a sixth more than its length; anterior dorsal profile high, strongly convex and very steep, forming a thin sharp ridge before dorsal fin; anterior ventral profile more gently and regularly curved; the large circular eye 3.8 to 4 times in head, twice or a little more than twice in snout, and 1.3 to 1.4 times in the broad, elevated interorbital; a smooth bony hump in front of upper part of eye; snout 1.8 to 1.84 times in head; posterior margin of preopercle inclined about 45°, its broadly rounded angle beneath anterior part of eye, its depth twice in head; the small terminal mouth has 9 small teeth on each side of upper jaw, their pointed tips lobate denticulate; teeth of lower jaw shorter, broader, with blunter lobate denticulate tips; dorsal and anal fins regularly rounded and convex, the dorsal spines of moderate size and strength, the first one partially concealed and very short, 7.83 times in head, second spine half again as long, the last one 1.5 times in head; the dorsal rays equal the longest spine, gradually decreasing in length posteriorly, the last three much shorter and the fin angulate posteriorly; third anal spine twice in head, the anal rays similar to the dorsal in height and shape; depth of caudal peduncle 4 times in head; caudal

lunate, with sharply pointed lobes, the upper the longer, its length usually 3 times (2.87 to 3) in length; pectoral a little longer than head, about 3.3 times in length; ventral pointed, about 1.25 times in head; the sharp-pointed caudal spine has a short posteriorly projecting point, its length three-fourths an eye diameter.

Color in alcohol uniform reddish brown, with traces of longitudinal lines on sides; 7 longitudinal blue lines on side of head, the upper one running along lower margin of eye, the three upper ones running across snout and uniting with those on the other side; a similar blue band across interorbital, from eye to eye; dorsal and anal darker brown than body, with vestiges of a black spot in posterior axil of each; the other fins same color as body. When fresh the axillary spots were distinct.

According to Bleeker the body color is brownish red with about 30 longitudinal blue lines; the violet-blue dorsal and anal each with 5 to 7 longitudinal yellow bands on the rays, the upper margin violet, each with a black spot posteriorly in the axil; the caudal blackish brown anteriorly, violet-brown posteriorly. These marks have all disappeared in my specimens.

The above description is based upon one specimen, 184 millimeters long, collected by Alvin Seale at Zamboanga, Mindanao, and 6 specimens, 163 to 185 millimeters long, obtained by the Bureau of Science collector G. A. Lopez, at Mariveles, Luzon.

The color of 6 fresh specimens, 150 to 188 millimeters in length, from Agutaya, one of the Cuyo Islands, was chocolate brown, with numerous longitudinal, more or less wavy blue lines on the sides, most distinct and broadest on the ventral half, those on the breast very broad; 7 longitudinal blue lines on side of head, the three upper ones uniting with those of the other side; a wider blue band from eye to eye, across interorbital; the region in front of, below, and behind eye more or less yellow; dorsal with a deep black longitudinal band below its base and a blue stripe above the black one; dorsal and anal chocolate brown, anal with a blue stripe along its base and two longitudinal blue stripes along its middle; the caudal and ventrals were brown like the body, the pectoral blackish basally, the posterior margin clear.

A large specimen, 270 millimeters long, also from Agutaya, has about 33 wavy blue longitudinal lines on body, counting across the body behind the pectoral. We also have two specimens, 190 and 158 millimeters long, from Subic Bay, and three specimens of medium size from the coast of Antique Province,

Panay. At the latter place it is very abundant, the Japanese fishermen bringing large quantities from there to Manila.

This distinct species was obtained by Bleeker at Batavia, Java, and Halmahera, and by Weber at Macassar, Celebes. It was also recorded from the Red Sea by Klunzinger. According to Weber it reaches a length of 300 millimeters.

ACANTHURUS DUSSUMIERI Cuvier and Valenciennes. Plate 14, fig. 3.

Acanthurus dussumieri CUVIER and VALENCIENNES, Hist. Nat. Poiss. 10 (1835) 147; GÜNTHER, Cat. Fishes 3 (1861) 335; Fische der Südsee 1 (1875) 112, pl. 72.

Hepatus dussumieri JORDAN and EVERMANN, Bull. U. S. Fish Comm. 23[1] (1903) (1905) 390, fig. 169; SEALE and BEAN, Proc. U. S. Nat. Mus. 33 (1907) 247.

Teuthis argenteus JORDAN and FOWLER, Proc. U. S. Nat. Mus. 25 (1903) 553.

Teuthis dussumieri JENKINS, Bull. U. S. Fish Comm. 22 (1902) (1903) 477.

Tagalog names, *indongan* and *samara*.

Dorsal IX–24 or 25; anal III–24.

Body deep, ovate, upper and lower profiles nearly evenly convex, or in very large specimens upper profile much more convex or even almost protuberant, depth 1.93 to 2.4 times, head 3.75 to 4 times in length; head deeper than long, nape boldly arched, snout steep or sometimes bulging forward, about 1.85 times in head; eye 4.4 to 4.6 times in head and 2.4 to 3.1 times in snout; interorbital very high, convex, its height 1.2 to 1.25 times eye, its breadth 2.85 times in head; mouth small, low, terminal, with 12 teeth on each side in upper jaw; rear margin of preopercle very oblique, its lower posterior angle beneath anterior portion of eye or even in front of a perpendicular from forward margin of eye; the circular anterior nostril has a thin membranous margin becoming a flap posteriorly; posterior nostril directly behind and much smaller; first dorsal spine very short and concealed in thick skin, the others increasing in length to the last, which is 1.77 to 1.9 times in head; soft dorsal of nearly uniform height, the longest rays 1.5 to 1.6 times in head, the last rays shortened and the fin angulate posteriorly; third anal spine 2.28 to 2.5 times in head, the soft anal like dorsal in shape, the longest ray about 1.75 times in head; the angulate pectoral equals or is a little longer than head; caudal peduncle thick, somewhat compressed dorsally, its depth 3 or a little less than 3 times in head; the large broad caudal lunate, with acute tips, 2.95 to 3.1 times in length; the pointed ventrals extend upon anal, about 1.4 times in head; the large caudal spine varies much in length and

thickness, 3 to 7.25 times in head; lateral line concurrent with dorsal profile, descending opposite to or before posterior end of dorsal to caudal spine.

Color in alcohol uniform brown, with a broad pale interocular band beginning behind each eye, and numerous dark brown longitudinal lines on nape, snout, sides of head, and breast; often these lines disappear after a time; the dorsal and anal may each have 3 or 4 longitudinal blue stripes and a basal band of the same color; pectoral dark anteriorly, with a yellow or clear transverse bar on posterior margin.

Fresh specimens were brown, the breast blackish brown, with many longitudinal wavy blue lines on head and body, and a broad bright yellow or orange band from behind eye forward around forehead to behind the other eye; a yellow bar at base of pectoral; the central part of caudal dark dull blue with numerous darker or blackish spots, the upper and lower margins sometimes orange; dorsal orange or yellow, the last few rays dull violet or dusky, with a dull yellow basal band and a blue band above it, a marginal blue or black line, and 3 or 4 more or less well-defined blue longitudinal lines, most evident posteriorly; the yellow anal slaty or bluish dusky posteriorly, with a blue basal band, a blue marginal line, and 3 or 4 blue longitudinal lines; ventral pale yellow, the membrane bluish; caudal spine brown with a black sheath.

The above description is from a specimen, 325 millimeters long, from Olongapo; one, 280 millimeters long, from Linapacan Island, Palawan Province; and one, 330 millimeters long, from Agutaya Island.

A specimen, 310 millimeters long, with a depth of 160 millimeters, was caught by me at Sitankai with hook and line. In life the brown body was marked with blue longitudinal vermiculations, the head sprinkled with a few blue dots; from behind eye a broad lemon yellow band extended forward across eye nearly to middle of forehead, but did not quite meet its fellow; a broad band of yellow on upper lip; the dorsal and anal were each dark lemon yellow with a broad basal band and 4 horizontal parallel stripes of lavender-blue; the pectoral was dark yellow-brown anteriorly, becoming bright lemon yellow posteriorly, with a clear margin; the ventral rays were dark yellow. In alcohol the color markings all disappeared, leaving the fish uniformly dark brown, with but a trace of the ocular band, and some brown vermiculations on the breast.

A female, 320 millimeters long, caught at Agutaya, one of the Cuyo Islands, during the first week in February, 1927, was nearly ready to spawn.

This species is abundant around rocky reefs and is brought to the Manila and Iloilo markets in considerable quantities by Japanese fishermen who catch it by the muro ami net method in the Visayas, especially about Sibuyan, Masbate, Tablas, and Bantayan.

I have examined numerous specimens and find them subject to very considerable variation in shape and color. The yellow interocular band is always present, though sometimes not entire across the frontal region, and separates this species at once from all related species. It is usually crossed by a longitudinal blue bar on its lower part, with another blue bar below it; the blue lines on the snout are wider than those on the body. This fish travels in schools of a dozen or so up to those containing several hundred. It takes the hook freely but is difficult to catch because its mouth is proportionately very small.

Seale and Bean had a specimen from Zamboanga.

Dussumier's surgeon fish is very common in the Hawaiian Islands and undoubtedly is equally abundant in all the intervening island groups between Honolulu and Palawan. The type specimen described by Valenciennes came from Mauritius.

ACANTHURUS MARGINATUS Cuvier and Valenciennes. Plate 3, fig. 2.

Acanthurus guttatus KITTLITZ, Mus. Senckenb. 1 (1834) 195; not of Bloch and Schneider.

Acanthurus marginatus CUVIER and VALENCIENNES, Hist. Nat. Poiss. 10 (1835) 162; GÜNTHER, Cat. Fishes 3 (1861) 333.

Dorsal IX–24; anal III–22.

Body ovoid, its greatest depth behind ventral fins, 1.91 to 1.93 times in length; anterior profile declivitous, boldly convex from dorsal to level of lower orbital margin, then more or less concave to tip of snout; head 3.33 to 3.57 times in length, placed obliquely, its depth equal to its length; ventral profile uniformly and moderately convex from lower lip to caudal peduncle; the concave snout 1.35 to 1.5 times in head; eye rather high up and anteriorly, 3.25 to 3.375 times in head and 2.25 to 2.5 times in snout, its anterior margin half or three-fourths its own diameter from anterior interorbital profile; interorbital broadly rounded, 3 times in head, twice or a little more than twice in snout; posterior margin of preopercle steeply inclined, forming

an angle of about 45°; its lower posterior angle obtusely angled, beneath anterior margin or anterior third of eye, its depth 2 to 2.25 times in head and about 1.5 times in snout; the opercular margin forms a broad bold curve; mouth low, small, with 11 or 12 teeth in upper jaw, their round pointed tips crenulate laterally as well as terminally; dorsal spines of moderate strength, the first one very short but scarcely concealed, its tip more or less evident, the last spine 1.6 to 1.8 times in head; soft dorsal a little higher than last dorsal spine, with an acutely pointed posterior angle; third anal spine 2 to 2.25 times in head; the soft anal equals or nearly equals soft dorsal in height and is of the same shape; depth of caudal peduncle 2.5 to 2.7 times in head; caudal deeply lunate, with elongatè pointed tips, the upper the longer, a third or more longer than head, 2.3 to 2.5 times in length; caudal spine slender, with an elongate point and a short posterior point, 2.7 to 2.8 times in head; pectoral a little longer than head; first ventral ray elongate, with filiform tip, its length a trifle more or less than head.

Color in alcohol uniform brown or chocolate brown, the vertical fins with a blackish brown linear margin; pectorals paler than body, the other fins concolorous or darker; the sides of head below level of eye and the body above pectoral base sprinkled with small circular whitish spots; a very deep chocolate brown spot in axil of dorsal and anal; a fine whitish line forms the posterior margin of caudal; two specimens have some curved, nearly vertical pale lines on sides of snout.

Here described from 4 specimens, 77 to 93 millimeters in length, obtained in the China Sea just outside Manila Bay, near Mariveles Point. This species was collected by Kittlitz at Luganor, one of the Caroline Islands, and has not been obtained since. The spots on the head were evidently blue in life, just as described by Kittlitz. My determination cannot be absolute, as I have seen neither authentic specimens nor the original description, but I have little doubt of its correctness. I prefer this disposition to calling it new.

ACANTHURUS NIGRORIS Cuvier and Valenciennes. Plate 4, fig. 1.

Acanthurus nigroris CUVIER and VALENCIENNES, Hist. Nat. Poiss. 10 (1835) 152; WEBER, Fische Siboga Exp. (1913) 317.

Acanthurus nigros GÜNTHER, Cat. Fishes 3 (1861) 332; Fische der Südsee 1 (1875) 110.

? Acanthurus bipunctatus GÜNTHER, Cat. Fishes 3 (1861) 331.

Hepatus elongatus JORDAN and EVERMANN, Bull. U. S. Fish Comm. 23 [1] (1903) (1905) 389, pro parte; ? JORDAN and RICHARDSON, Bull. Bur. Fisheries 27 (1907) (1908) 270.

Dorsal IX–24 or 25; anal III–23 or 24.

Depth twice, head 3.5 to 3.66 times in length; body ovate, much flattened laterally, anterior dorsal profile convex, declivitous, nearly straight from interorbital space to tip of snout, head small, with elongate snout, 1.4 times in head; eye small, 3.9 to 4.5 times in head and 2.8 to 3.2 times in snout; preopercle broad, deep, with very oblique rear margin, its lower angle rounded, beneath anterior margin of eye or before a perpendicular from eye, its depth about 1.85 times in head; mouth low down, inferior, with 6 broad teeth on each side of upper jaw; interorbital broad, high, convex, 3 times in head; depth of caudal peduncle 2.3 to 2.4 times in head; nostrils close together, anterior one with a thin membranous flap anteriorly and posteriorly, rear nostril elongate with a low membrane anteriorly; first dorsal spine low but not concealed, last one longest, 1.7 times in head; dorsal and anal similar in shape, acutely angulate posteriorly, the longest dorsal rays a little longer than the longest spine, about 1.5 times in head; third anal spine 2.1 or 2.2 times in head, the longest anal ray about 1.85 times in head; pectoral a trifle longer than head; the ventrals extend about to base of second anal ray, a little more or less than head in length; the deeply lunate caudal more than a fourth longer than head, about 2.7 times in length, tips attenuate, upper lobe longer; the caudal spine has a very long point, 2.7 to 2.8 times in head.

Color in alcohol uniformly brown or blackish brown, the lips and the dorsal and anal fins darker than body, with a black spot in the axils of the two fins; the caudal has a whitish line at its posterior margin; pectorals yellowish to brown; ventrals blackish; the margin of the groove in which the caudal spine lies black.

Here described from 3 specimens from Hamilo, Batangas Province, varying in length from 120 to 145 millimeters.

Jordan and Richardson recorded what is probably this species from Cagayancillo. I have two specimens from Guam, 45 and 50 millimeters long, which seem to belong to this species. They have but 5 teeth on each side in the upper jaw.

Elsewhere this species is known from the Pelew and Hawaiian Islands, the New Hebrides, and Samoa, and in the East Indies

from Rotti northward to the Karkaralong Islands a little south of Mindanao.

ACANTHURUS MATOIDES Cuvier and Valenciennes. Plate 16, fig. 3.

Acanthurus matoides CUVIER and VALENCIENNES, Hist. Nat. Poiss. 10 (1835) 150; GUNTHER, Cat. Fishes 3 (1861) 330.

Hepatus matoides JORDAN and EVERMANN, Bull. U. S. Fish Comm. 23[1] (1903) (1905) 387; EVERMANN and SEALE, Proc. U. S. Nat. Mus. 31 (1906) 509; JORDAN and RICHARDSON, Bull. Bur. Fisheries 27 (1907) (1908) 270; FOWLER and BEAN, Proc. U. S. Nat. Mus. 62 (1922) 57.

Teuthis matoides JENKINS, Bull. U. S. Fish Comm. 22 (1902) (1903) 478.

Acanthurus annularis CUVIER and VALENCIENNES, Hist. Nat. Poiss. 10 (1835) 153.

Teuthis annularis FOWLER, Proc. Acad. Nat. Sci. Phila. (1900) 513.

Acanthurus blochi CUVIER and VALENCIENNES, Hist. Nat. Poiss. 10 (1835) 153; GÜNTHER, Fische der Südsee 1 (1875) 109, pl. 69, fig. B.

Teuthis guntheri JENKINS, Bull. U. S. Fish Comm. 22 (1902) (1903) 477, fig. 29.

Hepatus guntheri JORDAN and EVERMANN, Bull. U. S. Fish Comm. 23[1] (1903) (1905) 388, fig. 168.

Dorsal IX–25 or 26; anal III–24 or 25.

The deep ovoid body strongly compressed laterally, the greatest depth just before anal fin, 1.7 to 1.87 times in length; anterior profile boldly convex from spinous dorsal to tip of snout, head 3.45 to 3.66 times in length, or the head proportionately larger in young specimens; snout long, about 1.25 in head, or 1.5 in young specimens; eye rather large, prominent, 3.5 to 3.8 times in head, 2 to 3 times in snout; in large old specimens it is proportionately much smaller, interorbital rather broadly rounded, not very high, 2.7 to 3 times in head; posterior margin of preopercle steeply inclined; the angle broadly rounded and beneath anterior nostril in well-grown specimens, its depth 1.6 times in head, 1.9 to 2 times in the young; the opercular margin gently and broadly curved; mouth small, low, inferior; nine teeth on each side in upper jaw, their tips long, pointed, crenulate or denticulate back on sides some distance; in young specimens often only 8 teeth are present; dorsal spines slender, the first one very short and concealed in the thick skin, the last one 1.4 to 1.56 times in head; the dorsal rays equal or a little higher anteriorly than the longest dorsal spine, 1.4 to 1.5 times in head, rounded posteriorly; third anal spine 1.92 to 2 times in head; the anal rays a little lower than the dorsal; slightly angulate posteriorly, 1.56 to 1.84 times in head; pectoral a little

less than head, its upper rays elongate; the pointed first ventral ray reaches beyond base of third anal spine, 1.2 to 1.25 times in head; caudal more or less lunate, upper lobe elongate and pointed, 2.7 to 2.9 times in length; the depth of the flattened caudal peduncle 2.4 to 2.6 times in head; the short, broad caudal spine has a short posterior projection, its length 3.33 to 3.8 times in head, equal to eye, or twice in eye in young specimens.

In life the color is uniformly brown, with a narrow longitudinal black band on the scaly base of dorsal and anal fins, and a blue band above it; the dorsal has 4 or 5 longitudinal orange bands alternating with blue or lavender bands, the margin with a black line; anal like dorsal; caudal membranes blue, with a blue crossband on posterior margin; pectoral blackish brown, with a broad yellow posterior margin, or may be nearly all yellow; caudal spine pale or whitish, in a black area; a yellowish area about eye.

In alcohol the color is brown to blackish brown, with a more or less distinct wide pale or whitish band on base of caudal; the bands on dorsal and anal disappear entirely; ventrals blackish.

Here described from a specimen, 169 millimeters long, from Honolulu, Hawaii, one from Jolo with a length of 135 millimeters, and two specimens, 79 and 81 millimeters long, from Zamboanga, Mindanao.

A fresh specimen, 185 millimeters long, from Manila Bay, was brownish black, becoming bluish black below; the dorsal with 5 longitudinal pale dull yellow and 4 blue bands; a deep blue band on its base, with a narrow yellow band below it; a black line along margin; the anal had 4 yellow and 4 blue bands; the pectoral was blackish above, the outer third lemon yellow, its inner surface dusky greenish yellow merging into lemon yellow marginally; the iris was pale golden; starting behind eye was a lemon yellow bar which extended forward of eye upon snout, its lower margin a broad dark blue line; the lips were dark blue, with a lemon yellow spot behind their posterior angle; the caudal had an obscure pale basal crossband, the fin deep black posteriorly; the caudal spine and sheath were black.

A specimen, 340 millimeters long, collected in the lagoon at Pearl Bank, has the depth 2 times, the head 3.77 times in the length; snout 1.38 times, eye 5.6 times in head and 4 times in the long, boldly convex snout; nape laterally compressed, ridge-like; the longest dorsal spine twice, the longest rays 1.6 times in head; anal a little lower than dorsal, both fins angulate pos-

teriorly; caudal spine 4.7 times in head, and nearly a fourth longer than eye.

Small specimens have the head differently shaped, sometimes the profile from dorsal to tip of snout forming a steep, almost straight line; a conspicuous whitish or pale band is often present on the basal portion of caudal, its anterior margin sharply defined but merging gradually into brown posteriorly.

In addition to the above, I have examined many living and fresh specimens in various parts of the Islands, and have studied alcoholic specimens ranging in length down to 29 millimeters, as follows:

Mission, Cagayan Province, 1.
Paraoir, La Union Province, 1.
Hundred Islands, Pangasinan Province, 1.
Subic Bay, 1.
Manila, 1.
San Miguel Bay, Camarines Sur Province, 1.
Calapan, Mindoro, 6.
Bantayan Island, 1.
Guimaras Island, 1.
Zamboanga, Mindanao, 1.
Tubigan Island, Sulu Province, 5.
Pearl Bank, Sulu Province, 2.
Sibutu, Sulu Province, 2.
Sitankai, Sulu Province, 1.
Sandakan, Borneo, 1.

This handsome species attains a length of 450 millimeters, and is common about submerged rocky reefs, traveling in small schools like flocks of sheep. Many living specimens from Puerto Galera and Calapan, Mindoro, have been kept under observation in the Bureau of Science aquarium. This species is subject to very considerable variation in shape, the proportions of the eye, and color markings; the caudal spine also varies a good deal in length, but is always relatively stout and short. In alcohol the color markings, including the bands on the fins, disappear entirely as a rule.

The synonymy of this species is in a deplorably confused condition and I make no claim to having clarified the situation. However, my extensive observations have convinced me that the separation of *Acanthurus blochi* or *A. guntheri* from *A. matoides* as distinct species is not justified, and that there is no definite boundary line between those with a large and those with a small eye, those with banded and those with plain vertical fins, and those with convex and those with nearly straight anterior dorsal profile.

This species has been recorded from Zamboanga and Jolo by Evermann and Seale; from Calayan, one of the Babuyan Islands, and Aparri, by Jordan and Richardson; and from Cebu by Fowler and Bean.

Acanthurus matoides was originally described from Oualan, one of the Caroline Islands. It is known from the east coast of Africa, the Red Sea, and île de France to the north coast of Australia, and the Hawaiian and Society Islands in the South Pacific Ocean.

ACANTHURUS MINDORENSIS Herre, sp. nov. Plate 4, fig. 2.

Dorsal IX–26; anal III–23.

The oblong ellipsoid body very much compressed laterally, depth at origin of ventrals 2.3 times in length; head strongly oblique, its length 3.4 times in total length; anterior dorsal profile convex from origin of dorsal to level of lower margin of eye, the rest concave; the thin concave snout long, 1.38 times in head; eye 4.16 times in head, high up, 3 times in snout; the broad, low, gently rounded interorbital 2.94 times in head and nearly thrice eye; posterior margin of preopercle very steep, the angle very obtuse, rounded, its depth 1.85 times in head, and three-fourths the length of snout; mouth very low down, with protuberant jaws, inclined diagonally downward and forward, with 8 broad teeth on each side in upper jaw, their tips rounded, denticulate laterally for most of their length; teeth in lower jaw broader, not denticulate so far back, 8 or 9 on each side; dorsal spines rather stout, the first one longer than in most species and not concealed, the last one $\frac{7}{9}$ as long as snout and 1.78 times in head; dorsal rays equal last dorsal spine in height, the posterior rays broadly rounded, not elongate; third anal spine much lower, 2.62 times in head; the anal resembles dorsal but is lower, the posterior rays longest, a little more than twice in head; the broad caudal lunate, the lobes not produced, a fifth longer than head, 2.83 times in length; depth of caudal peduncle 2.77 times in head; caudal spine narrow, with a long slender point, equal to eye in length; pectoral shorter than head, 1.16 times in head; ventral pointed, tips not elongate, 0.7 as long as head.

Color in alcohol black, sides of head and breast blackish brown; at base of caudal fin a deep brown ring; all the fins black.

Here described from the type specimen, 170 millimeters long, from Calapan, Mindoro, which has been kept alive a long time in the Bureau of Science aquarium.

I place here a specimen, 184 millimeters long, recently collected at Bantayan Island; dorsal IX–25; anal III–23; teeth above 9, below 10; it is much deeper proportionately, depth

1.88 times in the length, but does not differ materially in other proportions. The color in alcohol is blackish brown, the vertical fins, posterior part of pectoral, and the ventrals black; the caudal is lunate, its central portion black to the posterior margin.

ACANTHURUS PHILIPPINUS Herre, sp. nov. Plate 5, fig. 1.

Dorsal IX–24, sometimes 23; anal III–23 or 24.

Body elongate, ellipsoid-ovoid, greatest depth between ventral and anal fins and 2.16 to 2.2 times in length, head 3.5 to 3.85 times in length; anterior dorsal profile boldly convex, forming a smooth curve from dorsal to mouth, or the region above eyes nearly straight and a bulge before eyes; ventral profile uniformly and strongly curved from mouth to caudal peduncle; snout twice to 2.19 times in head, the circular eye of moderate size, 3.5 to 3.7 times in head and 1.6 to 1.8 times in snout; interorbital rather low, 2.85 to 3 times in head; posterior margin of preopercle steeply inclined, often more or less bowed, the angle obtuse, the depth 2.3 to 2.4 times in head; mouth very small, terminal, a little below median line, lips thin and not prominent; the slender teeth much smaller than in any other Philippine species, with narrow, pointed, finely serrate tips, 10 on each side in upper jaw and 12 to 14 on each side in lower jaw; nostrils small, inconspicuous, the anterior one with a small posterior flap of skin, the posterior one partly concealed by skin; first dorsal spine very low, embedded in thick skin, the last spine twice, down to 1.8 times in head; dorsal rays equal to or usually a little higher than last spine, the posterior rays round pointed; third anal spine 2.2 to 2.6 times in head; anal rays equal to dorsal, posterior rays a little higher, forming an elongate, acutely pointed angle; caudal peduncle thick, somewhat flattened above and below, its depth 2.6 to 2.9 times in head; caudal deeply lunate, tips elongate, the upper one narrow, pointed, and much the longer, 2.4 to 2.75 times in length; pectoral longer than head, 3.15 to 3.4 times in length; ventrals short, broad, 5 to 5.2 times in length; caudal spine about 3 times in head, slender, with an elongate sharp point and a short sharp backward projection.

Color in alcohol dark purplish brown, the vertical fins blackish or deep chocolate; caudal pale brownish yellow; pectoral and ventrals black or deep brown. The caudal was evidently yellow in life, the base more or less dusky.

Here described from 9 specimens, 109 to 143 millimeters in length, from Calapan, Mindoro. The pale caudal and the

teeth serve to distinguish this species at once from any other member of the group known to me.

Genus PARACANTHURUS Bleeker

Paracanthurus BLEEKER, Ned. Tijd. Dierk. 1 (1863) 252; Ned. Tijd. Dierk. 2 (1865) 190 and 288; Poissons in Fauna Madagascar, Pollen and Van Dam, part 4 (1875) 97; Arch. Neerl. Sci. Nat. 13 (1878) 51.

Colocopus GILL, Proc. U. S. Nat. Mus. 7 (1884) 279.

Note on *Paracanthurus* Bleeker, FOWLER, in Copeia, No. 155 (June 24, 1926) 139.

This genus is separated from *Acanthurus* by having but three rays in the ventral fins. Only one species of singularly beautiful color and unique marking is known, an inhabitant of the Indo-Pacific tropical waters.

Fowler has called attention to the fact that Bleeker in the publication first cited above wrote *Paracanthurus hepatus* Blkr. =*Acanthurus hepatus* Bl. Bleeker gave no generic diagnosis of his name *Paracanthurus*, but there can be no question as to the species to which he referred.

PARACANTHURUS LAMBDURUS (Gill). Plate 13, fig. 3.

Paracanthurus hepatus BLEEKER, Ned. Tijd. Dierk. 1 (1863) 252.

Colocopus lambdurus GILL, Proc. U. S. Nat. Mus. 7 (1884) (1885) 279.

Acanthurus hepatus CUVIER and VALENCIENNES, Hist. Nat. Poiss. 10 (1835) 134, pl. 288; not *Teuthis hepatus* L., a West Indian species; GÜNTHER, Cat. Fishes 3 (1861) 341; Fische der Südsee 1 (1875) 115, pl. 75; Challenger Exp., Zoology 1 (1880) Shore Fishes, 52; PETERS, Monatsber. Akad. Wiss. Berlin (1877) 835; DAY, Fishes of India (1878) 206; GÜNTHER, Fishes Challenger Exp., Zool. 1 (1880) 52.

Tao Sug name, *umayi*.

Dorsal IX–19 or 20; anal III–18 or 19; ventral I–3.

Head and trunk much flattened laterally, elongate-ovoid, depth 2.1 to 2.45 times in length; anterior dorsal profile forms a boldly convex curve, ventral profile gentler, flatter, and somewhat irregular; head 3.5 to 3.8 times in length, snout 1.3 to 1.55 times in head; eye variable in size but always small, not quite circular, 3.8 to 5.3 times in head, 2.45 to 3.77 times in snout, and 1.1 to 1.44 times in the high, narrowly convex interorbital space; posterior margin of preopercle very steeply inclined, with a broad curved angle beneath or in advance of anterior margin of eye, its depth 1.7 to 1.88 times in head; mouth low, horizontal, terminal, with 6 broad teeth on each side in upper jaw, their pointed tips irregularly and deeply incised and den-

ticulate-lobate; the teeth of lower jaw have broader tips with deeply incised and divergent lobes; dorsal and anal of moderate height, highest anteriorly, angulate posteriorly; first dorsal spine very short, not concealed, the longest dorsal spine 2.1 to 3.2 times in head, soft dorsal lower than spinous portion, the longest rays 2.5 to 3.75 times in head; anal resembles dorsal in height and shape; depth of caudal peduncle 2.8 to 3 times in head; short caudal more or less emarginate, upper and lower margins with pointed tips slightly prolonged posteriorly, 4.36 to 4.57 times in length; the caudal spine varies from 0.8 an eye diameter to 1.6 times eye, its point very long and sharp; pectoral a little shorter than head; ventral spine longer than rays, 1.8 to 2.25 times in head; scales very small and rough, except on cheeks and snout where they become much larger and form bony stellate plates.

The color when fresh is brilliant ultramarine, becoming indigo about base of pectoral and on basal half of dorsal and anal membrane, duller on snout and paler on belly; from eye a black band goes up and back below base of dorsal to tip of caudal, rapidly becoming much broader to posterior part of dorsal, then narrowing again; beneath third dorsal spine a narrow black band curves downward and backward to tip of lower side of caudal; a broad black area below soft dorsal coalesces with upper and lower black bands, which have a blue island between them; a large brilliant yellow triangle on caudal, its apex extending forward of caudal spine; dorsal spines and rays yellow with a dusky marginal band, wider and becoming black posteriorly; anal like dorsal but spines and rays brownish or black; basal half or two-thirds of pectoral deep blue, its upper margin black, its outer part lemon yellow above, colorless below; ventral spine and rays blue, the membrane orange; eye deep black; the starlike scales on snout and cheek outlined with orange.

In alcohol the colors are similar but less brilliant, the intense blue becoming gray-blue, the other colors less vivid. According to Günther it may be violet instead of blue, the vertical fins yellow with a broad violet margin.

This extraordinarily beautiful fish is here described from 5 specimens, ranging in length from 128 to 192 millimeters, from the following localities:

Elefante Island, Marinduque Province, 1.
Simara Island, 1.
Tablas Island, 1.
Jolo, Sulu Island, 2.

Apparently this species is not abundant. It has been recorded from the Philippines by Günther, who had a specimen collected by the Challenger Expedition at Zamboanga. It ranges from Mauritius through the East Indies to New Britain in the Bismarck Archipelago and the Gilbert Islands. It reaches a length of 250 millimeters.

Genus CTENOCHAETUS Gill

Ctenochaetus GILL, Proc. U. S. Nat. Mus. 7 (1884) 277.
Ctenodon (Bon.) KLUNZINGER, Prosp. Syst. It. Gen. (1831) 109; name preoccupied.

This genus is separated from the other acanthurids by the teeth, which are long, slender, movable, each with the tip dilated and serrated on one side, spoonlike.

Dorsal spines 8 or 9.

Two species are known.

Key to the species of Ctenochaetus.

a^1. Depth 2.3 to 2.4 in length; body dark blue, purplish, or reddish brown, with 9 to 11 longitudinal bluish white stripes; no spots on sides of head ..... C. striatus.

a^2. Depth 1.8 to 2 in length; body brown with many narrow irregular longitudinal blue lines on sides, or these whitish or disappearing; small spots on sides of head ..... C. strigosus.

CTENOCHAETUS STRIATUS (Quoy and Gaimard). Plate 13, fig. 2.

Acanthurus striatus QUOY and GAIMARD, Voy. Uranie, Zoologie 2 (1824) 373; Atlas (1824) pl. 63, fig. 3; CUVIER and VALENCIENNES, Hist. Nat. Poiss. 10 (1835) 168; GÜNTHER, Cat. Fishes 3 (1861) 334.

Dorsal IX or VIII–26 to 29; anal III–25 to 27.

Depth of the oblong, ovoid, strongly compressed body 2.3 to 2.4 times, head 3.25 to 3.3 times in length; upper and lower anterior profiles evenly and boldly convex; snout 1.77 to 1.88 times in head; eye 2.9 to 3.4 times in head and 1.6 to 1.8 times in snout; posterior margin of preopercle inclined about 45°, its broad angle in advance of eye; its depth 0.2 to 0.4 more than eye diameter; dorsal and anal fins similar in outline, of moderate height, the rays at posterior angle elongate and forming an acute and almost filiform point; dorsal spines weak, the last one lower than the succeeding rays, about twice in head, the elongate posterior rays half again as high; anal rays as high as dorsal; depth of caudal peduncle 2.5 to 2.8 times in head; the deeply lunate caudal 2.47 to 2.6 times in length, its lobes broadly pointed, the upper one a trifle longer than the lower;

caudal spine slender, very pointed, 3.4 to 4 times in head; pectoral a little shorter than head, 3.45 to 3.66 times in length; first ventral ray elongate, with filiform tip, 4.25 to 4.5 times in length.

The color of formalin specimens dark blue, bluish purple, or purplish black, with 9 bluish white longitudinal lines on sides, inclined diagonally downward; often there are traces of one or two more longitudinal lines, or they may be plainly evident; a curved blue line extends from eye forward and downward on snout, and there is another one beneath eye; dorsal bluish black, with narrow blue lines starting at base and running upward, then back longitudinally, about 5 anteriorly, 8 on posterior part; a dark blue margin, and a black spot in axil; anal bluish black with a dark blue margin, the bluish diagonal lines fewer in number and little evident; pectoral colorless; caudal black, with a blue marginal line above and below, the tips of the lobes paler; ventrals bluish black, with a blue marginal line.

In alcohol specimens are reddish brown, the snout, cheeks, and breast paler, the longitudinal stripes nearly white; dorsal, anal, and caudal dark brown, the black axillary spot of dorsal conspicuous; pectoral colorless, ventrals blackish.

The longitudinal lines were probably violet in life.

Here described from 12 formalin and 15 alcoholic specimens, 43 to 60 millimeters in length, collected at Guam, where this species is an important article of food when great schools of this little fish approach the shore. The Bureau of Science collection also contains a specimen, 51 millimeters long, from Mangarin, Mindoro.

This species is entirely distinct from *Ctenochaetus strigosus* (Bennett), with which it has been confused by Günther, Jordan, and others. Specimens of *strigosus* of the same size are altogether different.

CTENOCHAETUS STRIGOSUS (Bennett). Plate 15, figs. 2 and 3.

Acanthurus strigosus BENNETT, Zool. Journ. 4 (1828) 41; CUVIER and VALENCIENNES, Hist. Nat. Poiss. 10 (1835) 179; GÜNTHER, Cat. Fishes 3 (1861) 342; KNER, Novara Exp., Fische (1865) 211; GÜNTHER, Fische der Südsee 1 (1873) 116, pl. 79, fig. B; STEINDACHNER, Denkschr. Ak. Wiss. Wien 70 (1900) 494.

Ctenochaetus strigosus JENKINS, Bull. U. S. Fish Comm. 22 (1902) (1903) 480; SNYDER, Bull. U. S. Fish Comm. 22 (1902) (1904) 534; SEALE, Occ. Papers Bishop Mus. 1 (1901) 109.

Acanthurus ctenodon CUVIER and VALENCIENNES, Hist. Nat. Poiss. 10 (1835) 178, pl. 289; GÜNTHER, Cat. Fishes 3 (1865) 342.

Ctenochaetus striatus JORDAN and EVERMANN, Bull. U. S. Fish. Comm. 23[1] (1903) (1905) 398, fig. 174; JORDAN and SEALE, Bull. Bur. Fisheries 25 (1905) (1906) 355; EVERMANN and SEALE, Bull. Bur. Fisheries 26 (1906) 97; FOWLER and BEAN, Proc. U. S. Nat. Mus. 62 (1922) 57.

Dorsal VIII–24 to 28; anal III–24 to 26.

The ovoid, laterally compressed body is deepest in line with base of ventrals, depth 1.83 to 2 times, head 3.3 to 3.6 times in length; anterior dorsal profile more or less strongly convex, nape appressed and forming a convex ridge; the outline from below and sometimes above eyes forms a straight or nearly straight line to tip of snout; ventral profile much less convex than upper; eye high up, near anterior profile, 3.3 to 3.4 times in head and 2.2 to 2.5 times in the large broad snout, which is 4.88 to 5.1 times in length and 1.33 to 1.5 times in head; the broad interorbital 2.5 to 2.75 times in head; depth of preorbital 1.4 to 1.8 times in head, its posterior margin very steeply inclined, its broadly rounded angle beneath center or anterior part of eye; the small mouth very low down, with thick protuberant lips, and 17 to 19 long slender movable teeth on each side of upper jaw, the tip dilated like a one-sided spoon, serrated on the expanded side only, and set diagonally in jaw; teeth in lower jaw similar in shape, likewise set obliquely, 20 or 21 on each side; first dorsal spine very low, embedded in the skin, second spine short and almost concealed, the other spines increasing in length to the last, which is 1.7 times in head; soft dorsal higher than spinous dorsal, the rays increasing in length to the broadly to acutely angulate and pointed posterior portion, the longest rays 1.2 to 1.3 times in head; anal shaped like dorsal but lower, the posterior rays always sharply angulate or produced to a point, third anal spine 2.1 to 2.33 times in head; the longest anal rays a little shorter than longest dorsal rays; the pectoral exceeds head and may be a sixth longer; ventral elongated to a narrow pointed tip, equal to or a little shorter than head; depth of caudal peduncle 2 to 2.25 times in head; caudal deeply lunate, with narrow pointed lobes which may be nearly equal in length or the upper one elongate and filiform, 2.25 to 2.7 times, rarely twice in length; caudal spine narrow, very long-pointed, knife-like, 2.75 to 3 times in head.

Color in life reddish brown to chocolate brown, with many narrow wavy blue, more or less irregular, longitudinal lines along sides; around eyes, on nape, snout, and cheeks, are small circular brownish red or golden spots; on dorsal are two to

several longitudinal blue lines; similar lines may be present on anal; eyes brilliant sapphire.

A living specimen, placed in a small glass vessel, turned light orange yellow, with many fine bluish white longitudinal lines on trunk; the head and breast were smoky gray, sprinkled with pale blue spots; the dorsal and anal were lemon chrome, their posterior tips dusky, and each with a black marginal line; the caudal was pale lemon, with a black marginal line; the ventrals were lemon chrome, the pectoral pale yellow; the eyes did not change. I believe this remarkable color change was due to fright, although the greater intensity of light was a contributory factor.

In alcohol the color varies from pale to blackish brown, the dorsal, anal, and caudal darker than body; a black spot at posterior axil of both dorsal and anal; the blue longitudinal lines on body largely or altogether disappear; if they remain they become pale whitish streaks; the golden spots on head disappear or turn whitish; pectorals paler than the other fins; ventrals dusky or blackish, darkest along outer margin; caudal spine in a brown or blackish sheath.

In the Bureau of Science collection are the following specimens, ranging in length from 35 to 160 millimeters:

Manila, 1.
Nasugbu, Batangas Province, 1.
Calapan, Mindoro, 52.
Puerto Galera, Mindoro, 2.
Sibubu, Camarines Sur Province, 1.
Point Sialat, Catanduanes, 1.
Canigaran, Palawan, 1.
Tubigan Island, Sulu Province, 1.
Sibutu, Sulu Province, 5.
Sitankai, 1.
Guam, 4.

Specimens 60 millimeters or less in length are altogether different from the fish described by Quoy and Gaimard as *Acanthurus striatus*. I have no hesitancy in separating *Ctenochaetus striatus* and *C. strigosus*, as specimens of the same length differ widely in form, bulk, and color. *Ctenochaetus strigosus* is always deeper than *striatus* of the same length.

This species is abundant about coral reefs everywhere and is our commonest representative of the family. In addition to those listed, I have seen specimens from many other localities, both Philippine and foreign. It was reported by Evermann and Seale and by Fowler and Bean from Zamboanga. It is found throughout the tropical Pacific, from the Philippines and New

Guinea to the Hawaiian Islands on the north and the Samoan, Austral, and Society Islands on the south.

Genus ZEBRASOMA Swainson

Zebrasoma SWAINSON, Nat. Hist. 2 (1839) 256.

From *Acanthurus* this genus is separated chiefly by the short spinous dorsal of 3 to 5 graduated spines; the soft dorsal and anal are high, in some species excessively so. In other respects it does not differ essentially from *Acanthurus*. A small genus confined to the Indo-Pacific region.

Key to the Philippine species of Zebrasoma.

a^1. Head and anterior part of body with pale blue or whitish dots, passing posteriorly into fine longitudinal lines; highest dorsal rays equal to head ..... **Z. flavescens.**

a^2. Body with 6 broad yellow, white, or reddish brown crossbands, each interspace with several black vertical lines; dorsal rays very high, very much longer than head ..... **Z. veliferum.**

ZEBRASOMA FLAVESCENS (Bennett).

Acanthurus flavescens E. T. BENNETT, Zool. Journ. 4 (1828) 41; GÜNTHER, Fische der Südsee 1 (1875) 116, pl. 76; HERRE, Fishes Marcus Island, Occ. Papers Bishop Mus. 2 (1903) 234.

Zebrasoma flavescens JORDAN and EVERMANN, Bull. U. S. Fish Comm. 23[1] (1903) (1905) 397, pl. 59; JORDAN and SEALE, Bull. Bur. Fisheries 25 (1905) (1906) 355.

Acanthurus rhombeus KITTLITZ, Senckenb. Mus. 1 (1834) 196, pl. 13, fig. 6; GÜNTHER, Cat. Fishes 3 (1861) 342.

Zebrasoma rhombeum JORDAN and SEALE, Bull. Bur. Fisheries 25 (1905) (1906) 355; JORDAN and RICHARDSON, Bull. Bur. Fisheries 27 (1907) (1908) 270.

Acanthurus scopas CUVIER and VALENCIENNES, Hist. Nat. Poiss. 10 (1835) 180, pl. 290.

Acanthurus altivelis CUVIER and VALENCIENNES, Hist. Nat. Poiss. 10 (1835) 183.

Acanthurus virgatus VAILLANT and SAUVAGE, Ann. Sci. Nat. (1875) 283.

Acanthurus agaña SEALE, Occ. Papers Bishop Mus. 1 (1901) 110.

Dorsal V–24 or 25; anal III–19 to 21.

Body very deep, compressed, dorsal and ventral outlines equally and evenly convexly curved from a perpendicular at origin of dorsal to caudal peduncle, greatest depth between ventral and anal, 1.4 to 1.8 times in length; the obliquely placed head 2.8 to 3.2 in length, much compressed, pointed, upper anterior profile very steep, oblique to nearly perpendicular from first

dorsal to middle of interorbital, the long snout very concave, 1.25 to 1.36 times in head; the circular eye high up, very near profile, 4 times in head (3.66 in small specimens), 3 to 3.15 times in snout (2.75 in young specimens), and a little less than the nearly flat interorbital; jaws produced, equal or the lower one inferior, mouth very low; 8 or 9 lobate teeth on each side of both upper and lower jaws, their lobate tips rounded or more or less acute; anterior nostril about twice the size of posterior nostril, both with marginal flaps; preocular groove very short and steeply inclined downward and forward; dorsal and anal both high; first dorsal spine short to very short, concealed, the other spines successively much longer, the last usually equal to snout, sometimes a little longer; anterior part of soft dorsal much the highest, second to fifth rays longest, remaining rays diminishing in length rapidly, posterior part of fin very low, the longest ray equal to or a little less than length of head; first anal spine very short, concealed, or its tip sometimes visible, third spine usually a fourth or a third less than snout; anal fin much more rounded in outline than dorsal, anterior rays longest, posterior margin of fin nearly vertical, the longest rays much lower than those of dorsal; least depth of caudal peduncle is 3 to 3.3 times in head; caudal a little shorter than head, its posterior margin slightly convex; length of pectoral equals or is slightly less than that of caudal; the angulate, pointed ventral about 1.4 to 1.5 times in head; length of the broad stout caudal spine varies from two-thirds an eye diameter to almost equal to eye, 4 to 5 times in head; before caudal spine is an oblong or ovate patch of hooked bristles; it may be little developed, with short bristles, or may extend almost to tip of pectoral, with very long, coarse bristles.

Color in life dark brown, blackish, or purplish brown, the patch of bristles on side before caudal black or paler than body color, or tips of bristles pale blue; the sides of head and the breast covered with fine pale blue dots; at the region of pectoral and behind origin of dorsal they pass into irregular, wavy, fine blue lines; some specimens have a pale blue bar along middle of side from gill opening to the patch of bristles; pectoral yellowish or pale blue; the other fins uniformly deep chocolate brown, brownish black, or deep purplish brown; caudal spine in a conspicuous white sheath.

In alcohol the color is little changed except that the blue dots and lines often change to whitish, or may disappear, and the color of the pectoral fades.

The above description is based on an examination of many living specimens and also alcoholic specimens, ranging in length from 65 to 129 millimeters, from the following localities:

Calapan, Mindoro, 30.
Bulalacao Bay, Mindoro, 1.
New Washington, Panay, 1.
Estancia, Panay, 1.
Tubigan Island, Sulu Province, 1.
Sibutu, Sulu Province, 1.

A specimen, 53 millimeters long, from Dumaguete, Oriental Negros, is light yellowish brown anteriorly, darker posteriorly, the dorsal light yellowish brown, the anal and caudal dusky brown. A specimen, 46 millimeters long, from Calapan, Mindoro, has six dorsal spines and no caudal spines.

A study of many specimens of *Zebrasoma flavescens* and *Z. rhombeus*, from various localities in the Pacific Ocean, especially Hawaii and Samoa, convinced me that they are merely color variations of the same species. Typical *flavescens* from Hawaii is everywhere chrome yellow, body and fins alike, and may be regarded as an albino variety of the species. The Dumaguete specimen mentioned above seems to be intermediate between the ordinary and the yellow form.

Jordan and Richardson had one specimen of this fish from Cagayancillo, Sulu Sea.

This species is abundant around coral reefs, and occurs from Mauritius, in the Indian Ocean, through the East Indies to Guam, Marcus Island, Hawaii, Samoa, and the Society Islands.

ZEBRASOMA VELIFERUM (Bloch). Plate 11.

Acanthurus velifer BLOCH, Ichtyologie 12 (1797) 106, pl. 427, fig. 1; CUVIER and VALENCIENNES, Hist. Nat. Poiss. 10 (1835) 184; GÜNTHER, Cat. Fishes 3 (1861) 344; DAY, Fishes of India (1878) 207.

Acanthurus blochi BENNETT, Proc. Zool. Soc. London (1835) 207.

Acanthurus hypselopterus BLEEKER, Nat. Tijd. Ned. Ind. 6 (1854) 313; STEINDACHNER, Denkschr. Akad. Wiss. Wien 70 (1900) 494, pl. 4, fig. 1.

Zebrasoma hypselopterus JENKINS, Bull. U. S. Fish Comm. 22 (1902) (1903) 479.

Zebrasoma veliferum JORDAN and EVERMANN, Bull. U. S. Fish Comm. 23[1] (1903) (1905) 396, fig. 173; JORDAN and SEALE, Bull. Bur. Fisheries 25 (1905) (1906) 356.

Dorsal IV–28 to 32; anal III–24 or 25.

Body strongly compressed laterally, irregularly ovoid in shape, the greatest depth at origin of ventrals or between ventrals and anal, 1.9 to 2 times in length; upper profile descends very slightly posteriorly from origin of dorsal to last third of body, then rapidly to caudal peduncle; ventral outline strongly

convex from throat to caudal peduncle; the appressed head 3.15 to 3.6 times in length; profile from dorsal to just below eye very steep and more or less slightly sinuous, that of snout markedly concave; snout about 1.5 times in head (1.47 to 1.62); eye high up, very near profile, 4 to 4.15 times in head, 2.5 to 2.8 times in snout, and about 1.3 times in the low, more or less rounded interorbital; snout produced, mouth very low, lower jaw inferior; 8 pointed teeth on each side in upper jaw, tips and sides lobate for half their length or more; 7 broader blunter teeth on each side in lower jaw; nostrils small, each concealed by a small flap; preocular groove begins immediately in front of eye and is inclined steeply forward, its length about 1.3 times in eye; dorsal and anal very high, the posterior rays much shorter and both fins broadly rounded posteriorly; first dorsal spine very short, concealed, the others successively much longer, the last longer than head, 2.66 to 2.9 in length; anterior dorsal rays very high, fifth, sixth, or seventh highest, 1.9 to 2.3 in length, the others decreasing in height to the last; first anal spine concealed, second and third very much longer, the last 1.4 to 1.8 in head; seventh to tenth anal rays longest, equal to or slighter longer than head; caudal peduncle flattened above and below, its depth 3.4 to 3.6 times in head; caudal broad, a little longer than head, its posterior margin nearly truncate; pectoral equals or is a little shorter than head; the angulate ventral approximately equals snout, 1.4 to 1.6 times in head; the stout, sharp-pointed caudal spine has a knifelike cutting edge, its length nearly equal to eye.

Color of a fresh specimen, 192 millimeters long, was very dark brown, the sides of snout and under chin mottled with white spots which were golden in life; the sides were barred by six broad golden yellow bands, inclined diagonally backward, and soon fading to white; the first band descended from nape, just before dorsal, to opercle, crossing posterior part of eye in so doing, then inclined sharply backward and down to ventral base; the last band crossed from base of last three dorsal rays to the corresponding anal rays; each of the broad brown interspaces between yellow crossbands from the second to the sixth is crossed by 4 or 5 black stripes; the dorsal and anal were nearly black, with numerous nearly vertical paler crosslines, more or less broken into rows of spots, most evident posteriorly, running from near margin inward and backward; pectoral and caudal like body, the last with a narrow whitish line on posterior margin; ventrals purplish black; the caudal spine was in a black spot, its sheath black.

In alcohol the color of the same specimen is as given above except that the golden or white crossbars have turned to whitish or reddish brown, and the crossbands on dorsal and anal have nearly disappeared leaving the vertical fins almost uniform black; the spots on cheeks and chin are but little evident.

In life the crossbands vary from lemon yellow to white; the dorsal and anal may be violet with blue crosslines or spots, or very dark brown with violet bands or rows of spots; any one or all of the fins may be yellow or golden. The color is subject to much variation, but the pattern is always the same and readily recognizable. Some specimens have the caudal pale; others have bluish crosslines on the dorsal and anal.

I have examined the following specimens, ranging in length from 48 to 192 millimeters:

Olongapo, Zambales Province, 2.
Balanacan, Marinduque, 5.
Elefante Island, 2.
Tablas Island, 1.
Bantayan Island, 1.
Agutaya Island, Cuyo Islands, 1.
Jolo, Sulu Province, 1.

Two specimens from an unknown locality, but probably Cebu, were collected by A. L. Day, formerly of the University of the Philippines. In these specimens, 48 and 55 millimeters long, the dorsal and anal are very much higher proportionately than in larger specimens.

This very striking-looking fish well deserves its name of sail bearer. It occurs from India to Hawaii and southeast to Samoa. It reaches a length of 400 millimeters, and a breadth with the extended fins of 350 millimeters.

Genus NASO Lacépède

Naso LACÉPÈDE, Hist. Nat. Poiss. 3 (1802) 105.
Monoceros BLOCH and SCHNEIDER, Syst. Ichth. (1801) 180; name preoccupied in Mollusca.
Naseus (Commerson, MS.) LACÉPÈDE, Hist. Nat. Poiss. 3 (1802) 105.

Samal name, *kumai tullong*.

Dorsal IV to VI–26 to 31; anal II–26 to 31; ventrals I–3.

In this genus the tail has two, rarely one or three, immovable bony plates on each side, these usually bearing high keen-edged knifelike keels or spines, which may be hooked or curved forward and are very formidable weapons.

The oblong, laterally compressed body usually deep, but in a few species elongate and more or less mackerellike in shape.

The adults of certain species present a most extraordinary appearance through the development of a long to exceedingly elongate slender conical horn on the forehead before the eyes. Other species develop a large convex compressed hump above the snout, which may project beyond the mouth. Those species without a frontal horn or hump have been separated by authors as belonging to the genus *Callicanthus* Swainson, but I do not believe it to be a valid genus.

Mouth small to very small, each jaw with a single row of small to very small, pointed or somewhat rounded incisorlike teeth, smooth or minutely serrate; one dorsal fin, with the soft portion much more developed than the spinous; dorsal spines heteracanthous; that is, the first, third, and fifth are broad and strong on one side, the first, second, fourth, and sixth on the other side; many species have the dorsal and anal rays heteracanthous also; the intestine is long to very long, with many circumvolutions, and four to eight pyloric cæca; air bladder large to very large, forked posteriorly, the branches extending much beyond abdominal cavity; branchiostegals 4 or 5; pseudobranchiæ well developed. Skin thick, tough, covered with minute rough scales which form a sort of shagreenlike covering.

Medium-sized to rather large herbivorous fishes confined to the tropical portions of the Indian and Pacific Oceans, where they range widely. Most of them are dull colored, mostly brownish, but a few species are vividly decorated, the caudal spines being set in patches of ornate brilliance, and one or two species are really very beautiful in coloration. The caudal spines are absent or feebly developed in the young, but soon reach a large size; there is much individual variation in their development, so that specimens of medium size often have the spines much higher than do larger specimens of the same species. Probably no fishes are better armed for defense than some species of *Naso*. A very slight blow from the tail of one of these terrifically armed fishes will cut a man's hand to the bone. In some species the caudal in old males has the upper and lower tips excessively elongated into slender filaments.

The development of the horn, in species provided with this singular protuberance, varies greatly in individuals of the same species. At all stages it imparts an extraordinarily grotesque appearance to the fish. Due to their bizarre physiognomy these fishes attracted the attention of the earliest voyagers to East Indian waters, but even yet they are very imperfectly known. Our knowledge of their development is fragmentary and until

the transformations in shape and the changes in the caudal spines due to age are better known our knowledge will continue to be inexact and various species will continue to be confused.

Some of the members of this genus are the largest of the acanthurids, and reach a length of two-thirds of a meter and a weight of 4 or 5 kilograms. The flesh of at least the larger species of the genus is firm, flaky, and well flavored. These fishes are best when baked or roasted, with the skin removed before being served.

Key to the Philippine species of Naso.

a^1. Two caudal plates on each side.

b^1. Forehead with a more or less elongate horn in adult specimens.

c^1. Horn extending beyond mouth, its axis passing through center of eye.

d^1. Dorsal spines 5; snout below horn steep but not subvertical, 1.5 to 1.7 times eye, about 3 times in head; 33 teeth on each side of upper jaw..... **N. brachycentron.**

d^2. Dorsal spines 6; snout below horn subvertical, very short, equal to or less than eye, 4.4 to 5.2 times in head; 24 teeth on each side of upper jaw..... **N. brevirostris.**

c^2. Horn not or very rarely extending beyond mouth, its axis not passing through center of eye; about 20 teeth on each side of upper jaw.

e^1. Horn very short, its axis below middle of eye; snout below horn moderate, ⅓ more than eye, 2.8 times in head; pyloric cæca 5..... **N. marginatus.**

e^2. Horn long, its axis above eye or through upper third of eye; snout very long, 4.5 to 5.25 times eye, 1.5 times in head; pyloric cæca 7 or 8..... **N. unicornis.**

b^2. No horn on forehead.

f^1. A convex and compressed hump upon snout in adult specimens.

g^1. Dorsal spines 5; gray or grayish brown, with many small, round, blue or brown spots; caudal truncate, never with elongate lobes..... **N. tuberosus.**

g^2. Dorsal spines 6, rarely 5; brown to blackish, with irregular vertical blue lines on sides down to anal; above sprinkled with large blue or brown dots; caudal with elongate lobes. **N. vlamingi.**

f^2. Forehead without a hump.

h^1. Opercle surrounded by a very broad, deep brown band; tongue blue-black; about 40 minute teeth on each side of upper jaw. **N. genimarginatus.**

h^2. Opercle not surrounded by a wide, deep brown band; tongue not blue-black.

i^1. Dorsal spines 6.

j^1. Caudal plates small, scarcely or not at all keeled; dorsal with 3, anal with 2, pale longitudinal bands; about 20 teeth on each side of upper jaw..... **N. hexacanthus.**

*f*². Caudal spines large, sharp pointed, the plates yellow or red, each set in a large patch of the same color; 14 to 16 teeth on each side of upper jaw..... **N. lituratus.**

*f*³. Dorsal spines 5; color brown, upper half of body with dark brown circular spots, some on sides of head; caudal spotted like body; 30 teeth on each side of upper jaw..... **N. lopezi.**

*a*³. One caudal plate on each side, caudal spine large, very sharp; dorsal spines 4 or 5; 36 to 40 teeth on each side of upper jaw. **N. thynnoides.**

NASO BRACHYCENTRON (Cuvier and Valenciennes). Plate 5, fig. 2.

Naseus brachycentron CUVIER and VALENCIENNES, Hist. Nat. Poiss. 10 (1835) 203; GÜNTHER, Cat. Fishes 3 (1861) 349.

Visayan name, *tudlo-an*.

Dorsal V–28 or 29; anal II–27 or 28; pyloric cæca 4.

Body oblong anteriorly, elongate-ovoid posteriorly, moderately compressed laterally, dorsal and ventral profiles alike and evenly curved from a vertical behind pectoral to caudal peduncle, depth at first or second anal ray 2.72 to 2.84 times in length, head comparatively broad, 3.9 to 4 times in length, the forehead produced into a very long, slender, tapering cylindrical horn which extends far beyond mouth, its axis passing through center of eye, or sometimes through upper third of eye; from eye to tip of horn its length varies from a little more than head to 1.4 times head; length of horn proper from base to tip varies from a little more than head to 1.5 times in head; upper profile below base of horn forms a steep straight line, about 3 times in head; it is a trifle less than distance from eye to first dorsal spine, and 1.55 to 1.68 times eye; anterior ventral profile made abruptly convex by a large hump below isthmus; snout about 1.45 times (1.43 to 1.47) in head; eye high up, 4.8 to 5 times in head, 3 to 3.33 times in snout, 1.85 to 2 times in the broad keeled interorbital, 1.55 to 1.68 times in the profile between horn and tip of lip, and 1.45 to 1.75 times in the distance from eye to first dorsal spine; margin of preopercle begins well below and behind lower margin of eye and descends anteriorly at an angle of 70°, its angle in advance of a vertical from eye, depth of preopercle 1.95 to 2 times in head; the large circular nostrils some distance before middle of eye, the anterior one largest, with a narrow white rim; below them is the preocular groove, inclined diagonally downward and forward, wide and deep but short, 1.2 to 1.6 times in an eye diameter; mouth slightly below median line, with large projecting lips and a prominent groove behind their angle; teeth small, conical, serrulate, about 33 on each side in upper jaw; first dorsal spine

3 to 3.7 times in head; the dorsal rays equal or exceed the spines in height, about 3 in head, fin low, angulate posteriorly; anal spines low, 4 to 5.66 times in head; anal like dorsal but lower, the rays 3.7 in head; caudal peduncle very broad, dorsoventrally flattened, its depth 1.4 to 1.5 times in its own breadth and about 6.5 times in head, caudal fin broad, a little longer than head, nearly truncate, the broad rays pinnate and lobate on posterior margin; pectoral about 1.66 times in head; ventral spine a little shorter than first ventral ray, about 3 times in head; on each side of caudal peduncle two large oval bony plates, the anterior one larger and equal to eye in length; each with a high, keen-edged, knifelike keel, variable in shape, triangulate to nearly rectangular, but not so large as in *N. unicornis;* scales in front of caudal spines and for some distance anteriorly along middle of side much coarser than elsewhere.

Color in alcohol dark purplish plum or olive, nearly black, on head and dorsally, and becoming paler purplish brown to violet-brown on sides and below; throat and breast may be violet-gray; dorsal and anal very dark purplish brown; pectoral deep brown with a white posterior margin; the caudal has more or less yellow or whitish yellow, mostly as stripes between the featherlike rays.

Here described from 3 specimens, 484 to 515 millimeters in length, collected at Bennett Island, Masbate Province.

These fine specimens were remarkably fat, the viscera being as fat-laden as those of a hog ready for butchering. The stomach is very long and bulky, and the intestines are exceedingly elongate and convoluted.

This species is readily separable from *N. brevirostris* by the much greater length of the anterior dorsal profile below the horn, from *N. unicornis* by the very different shape of the cheeks and snout and comparative length of the profile below the horn, and from both by the markedly different caudal, and by differences in shape and relative proportions of horn, eyes, snout, oculo-dorsal distance, etc.

I have no means of knowing positively that my specimens are *Naseus brachycentron* Cuvier and Valenciennes described from Waigiou Island, on the northwest coast of New Guinea, but I prefer this disposition to calling them new and perhaps adding to the already burdensome synonymy of this genus.

After the above was written my assistant, Mr. Montalban, obtained a choice specimen, 405 millimeters long, from Bantayan

Island. The dorsal and anal are narrowly edged with white; the caudal is slightly lunate, truncate when extended.

NASO BREVIROSTRIS (Cuvier and Valenciennes). Plate 5, fig. 3.

Naseus brevirostris CUVIER and VALENCIENNES, Hist. Nat. Poiss. **10** (1835) 204, pl. 291; BLEEKER, Nat. Tijd. Ned. Ind. **5** (1853) 165; Nat. Tijd. Ned. Ind. **9** (1855) 306; GÜNTHER, Cat. Fishes **3** (1861) 349; KLUNZINGER, Fische des Rothen Meeres (1871) 511; GÜNTHER, Fische der Südsee **1** (1875) 121, pl. 79, fig. A, and text figure 5; DAY, Fishes of India (1878) 209, pl. 38, fig. 4; WEBER, Fische Siboga Exp. (1913) 321.

Acanthurus brevirostris JENKINS, Bull. U. S. Fish Comm. **22** (1902) (1903) 481; JORDAN and EVERMANN, Bull. U. S. Fish Comm. **23** (1903) (1905) 401; STEINDACHNER, Sitzungsb. Akad. Wiss. Wien **115** (1906) 1394.

Naseus hoedti BLEEKER, Nat. Tijd. Ned. Ind. **5** (1853) 339.

Visayan name, *tudlo-an*.

Dorsal VI–27 to 29; anal II–28 to 30; pyloric cæca 3 + 2; vertebræ 9 + 13.

Body elongate, oblong-ovate, laterally compressed but the sides often moderately full and rounded, head much flattened laterally, dorsal and ventral profiles equally and evenly curved from a vertical at base of pectoral to caudal peduncle; depth 2.25 to 2.9 times in length; the head varies from 3.6 to 4.5 times in length, usually about 4 times; forehead produced into a stout, blunt or pointed, cylindrical, tapering horn, longer or shorter according to age, its axis passing through center of eye, extending forward horizontally beyond mouth, its length from anterior margin of eye a little more or less than length of head, its true length measured from anterior profile of forehead 6 to 9 times in total length or equal to or greater or more often less than snout measured from eye to tip of upper lip; total length of snout about 1.6 times in head, its anterior profile nearly vertical, its length from base of horn to tip of lip very short, subvertical, equal to or more often less than diameter of eye, 4.4 to 5.2 times in head; eye longer than high, 3.9 to 4.4 times in head and 1.4 to 1.5 times in the broad, elevated, smooth or keeled interorbital; posterior margin of preopercle begins behind middle of eye and is inclined downward at an angle of 60°, its lower angle beneath front margin of eye, depth of preopercle 2 to 2.2 times in head; mouth small, horizontal, on or slightly below axis of body, lips projecting; teeth very small, about 24 on each side of upper jaw, flat, their pointed tips

minutely or microscopically serrate; first dorsal spine stoutest, fifth longest, 2.1 to 2.6 times in head; dorsal rays much longer, fin high, increasing in length posteriorly for the first two-thirds, then decreasing slightly, the longest rays 1.7 to 1.2 times in head; second anal spine a little longer than the stouter first spine and a little more than eye in length, 3.7 times in head; anal like soft dorsal, but lower; caudal peduncle strongly compressed, flattened above and below, its depth 5.4 to 6.2 times in head; the caudal varies from convex to slightly emarginate, its length equal to or slightly shorter than head; pectoral 1.35 to 1.4 times in head; the stout ventral spine equals or nearly equals first ventral ray, 1.9 to 2.2 times in head; the broad deep groove in front of eye a little less than an eye diameter in length; the inconspicuous nostrils in a row above it, the anterior one twice as large as the posterior; each side of caudal peduncle with 2 bony plates, the posterior one on base of caudal fin, each with a wide, thin, laterally compressed, high, very keen-edged spine; the spines vary greatly in development, some being hardly more than ridges, but usually they are dangerous weapons, in some cases becoming curved forward into a very sharp hook; the whole body covered with minute hard scales, smooth and velvety when stroked backward, but very rough when one tries to rub in the opposite direction; the anterior scales on cheeks a little coarser, those on top of snout and horn much coarser.

Color variable, usually grayish brown or olive brown, paler below, sides of body more or less covered with many transverse rows of blue dots and blue bars breaking into dots below, sides of head with similar irregularly arranged spots; in some specimens the spots on head pass into nearly longitudinal stripes on horn and forehead; other specimens have the markings of darker brown and some have few or no markings; the vertical lines are usually best developed posteriorly, but in some specimens cover practically the entire side; the membranous posterior margin of opercle yellow; dorsal, anal, and pectorals uniform brown; the dorsal may have one or two faint longitudinal lines of darker brown; sometimes dorsal and anal each have a basal longitudinal line of blue; caudal yellowish or green, or the basal portion deep blue, with a yellow crossband posteriorly and a green or black marginal band, with a fine white line at its extremity; caudal spines brown, their tips clear.

In alcohol the blue markings change to dark brown.

Here described from 13 specimens, 208 to 313 millimeters in length, from the following localities:

Olongapo, Zambales Province, 2.
Calapan, Mindoro, 1.
Bulalacao Bay, Mindoro, 1.
Romblon, 1.
Tablas, 2.
Sibuyan, 1.
Tagapula Island, Samar Province, 1.
Bantayan Island, 2.
Zamboanga, Mindanao, 1.
Sitankai, Sulu Province, 1.

This species varies much in the size of the horn, the development of the caudal plates, and in color pattern, but is readily recognizable by the very short length of the nearly vertical snout between the horn and the mouth. It occurs from Mauritius and Ceylon in the Indian Ocean, to Hawaii, the Gilbert Islands, and Tahiti in the Pacific.

NASO MARGINATUS (Cuvier and Valenciennes). Plate 6, fig. 2.

Naseus marginatus CUVIER and VALENCIENNES, Hist. Nat. Poiss. 10 (1835) 207; GÜNTHER, Fische der Südsee 1 (1875) 122, pl. 83; SEALE and BEAN, Proc. U. S. Nat. Mus. 33 (1907) 247.

Monoceros marginatus SEALE, Occ. Papers Bishop Mus. 1 (1901) 114.

Priodon annularis CUVIER and VALENCIENNES, Hist. Nat. Poiss. 10 (1835) 223, pl. 294.

Naseus annulatus BLEEKER, Nat. Tijd. Ned. Ind. 9 (1855) 304; GÜNTHER, Cat. Fishes 3 (1861) 352.

? Monoceros annulatus SEALE and BEAN, Proc. U. S. Nat. Mus. 33 (1907) 247.

Acanthurus annulatus FOWLER and BEAN, Proc. U. S. Nat. Mus. 62 (1922) 57.

Head and body flattened laterally but lower half of body moderately plump; dorsal and ventral outlines alike, uniformly curved from head to caudal peduncle, the form that of an elongate ovoid, the greatest depth at posterior end of pectoral, 2.3 in depth; top of head very broad, nearly flat, keeled posteriorly, forehead extended forward into a short horn, in my specimen bluntly triangulate seen from above, its axis below middle of pupil, its tip never extending as far as tip of snout, and in my specimen not extending forward more than a third of the length of the mouth; head 3.65 times in length, snout two-thirds as long or 1.5 times in head; anterior profile of snout elongate, inclined at an angle of 50°, its length below horn about 2.85 times in head and a sixth more than eye; the distance from anterior margin of eye to tip of horn 2.3 times in head, the length of the horn proper beyond anterior profile 7.57 times in head or 5 times in distance from eye to tip of snout;

the large eye placed very high up and far back, three and a third times in head and 1.2 times in the wide interorbital; in front of lower part of eye a broad deep curved groove, less than half an eye diameter in length; above it two inconspicuous nostrils, the anterior one with a wide marginal flap and much larger than the posterior nostril; the small terminal mouth is below axis of body, and has a deep groove curving around posterior angle; the narrow, elongate, sharp pointed teeth minutely serrulate, about 20 on each side (18 + 22 in my specimen); the posterior margin of preopercle little evident, inclined at an angle of 60°, its origin below level of eye, its angle obtuse but hardly rounded; depth of preopercle twice in head; first dorsal spine stoutest and longest, 2.14 times in head; the other dorsal spines and the rays progressively lower posteriorly, the fin angulate; first anal spine stout but very short, 6 times in head, second spine a third longer; the anal rays are higher than anal spines but lower than soft dorsal and diminish in height posteriorly; the thick caudal peduncle flattened above and below, its depth and breadth equal, about 6 times in head; caudal lunate, upper margin pointed, a tenth longer than head; the broad blunt pectoral a trifle shorter than snout, nearly 1.6 times in head; the stout ventral spine a very little shorter than first ray, 0.4 the length of head or 2.5 times in head; two small horny plates on each side of caudal peduncle, the second one on base of caudal fin, each bearing a long, low, thin, dull-edged keel; the whole body covered with very fine microscopically scabrous scales, velvety when stroked toward tail, very rough when rubbed in the opposite direction, the scales larger behind eyes, below spinous dorsal, and on top of snout.

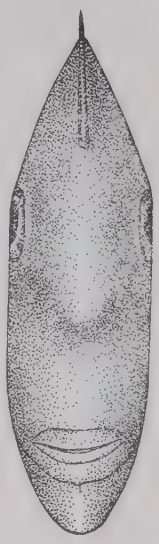


FIG. 1. *Naso marginatus* (Cuvier and Valenciennes); anterior view.

Color in alcohol uniform dusky brown above, merging into gray-brown below; lower lip white; the blackish brown pectoral has a white posterior marginal band; dorsal and anal white edged, dorsal brownish black; anal blackish brown with two pale longitudinal bands; the caudal has a broad whitish yellow band along its extremity; the membranous posterior margin of opercle chocolate brown.

Here described from a specimen, 219 millimeters long, collected at Gato, a rocky islet in the Visayan Sea north of Cebu; dorsal V–28; anal II–27. The longitudinal bands on anal are blue in life; tip of caudal is probably yellow in life. The horn may be longer than in the specimen described, but never extends as far as tip of snout.

I also have seven small specimens, ranging in length from 108 to 130 millimeters, from the following localities:

Calapan, Mindoro, 1.
Zamboanga, Mindanao, 2.
Jolo, Sulu Province, 2.
Bungau, Sulu Province, 1.
Sitankai, Sulu Province, 1.

In these specimens the dorsal has either 5 or 6 spines and 28 or 29 rays; the anal 27 or 28 rays. The caudal peduncle is encircled by a very noticeable broad white ring.

In life a specimen from Zamboanga was greenish olive, dusky at the base of the dorsal, very pale on the breast, with a broad milk white ring on the caudal peduncle; the dorsal and anal were dusky, each with a milk white marginal line, and with two bluish longitudinal bands; the caudal had a wide milk white posterior margin.

Another specimen, 170 millimeters long, from Bungau, Sulu Province, has a prominent hump on the forehead, opposite lower part of eye; this triangulate growth is the beginning of a horn.

Previously recorded from Zamboanga by Seale and Bean; they also named a specimen "20 inches long," from Zamboanga, *Acanthurus annulatus*. The *Priodon annulatus* of Quoy and Gaimard was an immature fish but 2.5 inches long, "deux pouces et demi." It is altogether unlikely that Seale and Bean had *annulatus* or that *annulatus* could be recognized in a specimen 20 inches long. Fowler and Bean described a specimen from Cebu, under the name *A. annulatus*.

This is an East Indian species primarily, although originally recorded from Tongatabu, one of the Tonga, or Friendly, Islands. Bleeker had many specimens, and recorded it from Sumatra, Batol, Java, Bali, Timor, Celebes, Boeroe, Amboina, Ceram, and Goram. It is also known from Guam, the Pelew Islands, and Aneitum, one of the New Hebrides.

NASO UNICORNIS (Forskål). Plate 6, fig. 1.

Chaetodon unicornis FORSKÅL, Descr. Anim. (1775) 63; Icones (1776) pl. 23.

Monoceros biaculeatus BLOCH and SCHNEIDER, Syst. Ichth. (1801) 180, pl. 42.

Monoceros raia BLOCH and SCHNEIDER, Syst. Ichth. (1801) 181.

Naso fronticornis LACÉPÈDE, Hist. Nat. Poiss. 3 (1803) 105, 106, pl. 7, fig. 2.

Acanthurus unicornis SHAW, Zoology 4 (1803) 374, pl. 50; JORDAN and EVERMANN, Bull. U. S. Fish Comm. 23[1] (1903) (1905) 402; JORDAN and SEALE, Bull. Bur. Fisheries 25 (1905) (1906) 357.

Aspirurus unicornis RÜPPELL, Fische des Rothen Meeres (1828) 60.

Naseus fronticornis (Commerson) CUVIER and VALENCIENNES, Hist. Nat. Poiss. 10 (1835) 191; CUVIER, Régne Anim. Disciples ed. 8 (1836) pl. 72, fig. 2; SCHLEGEL, Fauna Japonica, Poiss. (1842) 129, pl. 69.

Naseus olivaceus (Solander) CUVIER and VALENCIENNES, Hist. Nat. Poiss. 10 (1835) 212; GÜNTHER, Cat. Fishes 3 (1861) 352.

Naseus unicornis GÜNTHER, Cat. Fishes 3 (1861) 348; Fische der Südsee 1 (1875) 118, pl. 78 and 4 text figures; DAY, Fishes of India (1878) 209.

Monoceros unicornis EVERMANN and SEALE, Bull. Bur. Fisheries 26 (1906) 98.

Visayan names, *bakwak, tudlo-an.*

Dorsal V or VI–28 to 31; anal II–26 to 30; pyloric cæca 7 or 8.

The elongate ovate body laterally compressed, but the sides moderately rounded, the greatest depth at first or second dorsal ray, 2.15 to 2.35 times in length; the young much shorter and deeper proportionately; the elongate oblique head 3.45 to 3.6 times in length; snout very elongate, sheeplike, 4.1 to 4.3 times in length, or 1.19 to 1.25 times in head; the length of its upper profile, taken from base of horn, 1.55 to 1.6 times in head and 2.2 or 2.1 times in distance from eye to first dorsal spine; the axis of the long to very long tapering cylindrical horn lies above eye or may be in line with upper third of eye; in very large old specimens it may project beyond tip of snout, but ordinarily it does not extend to it; in my largest specimen the horn is longer than the snout, measured from eye to its tip 4 times in length, 1.1 times in head, measured from anterior profile 1.3 times in head; the prominent eye placed high up and very far back, 4.48 to 5.25 times in snout, 3.43 to 3.25 times in snout below horn, about 1.55 times in distance from eye to first dorsal spine,

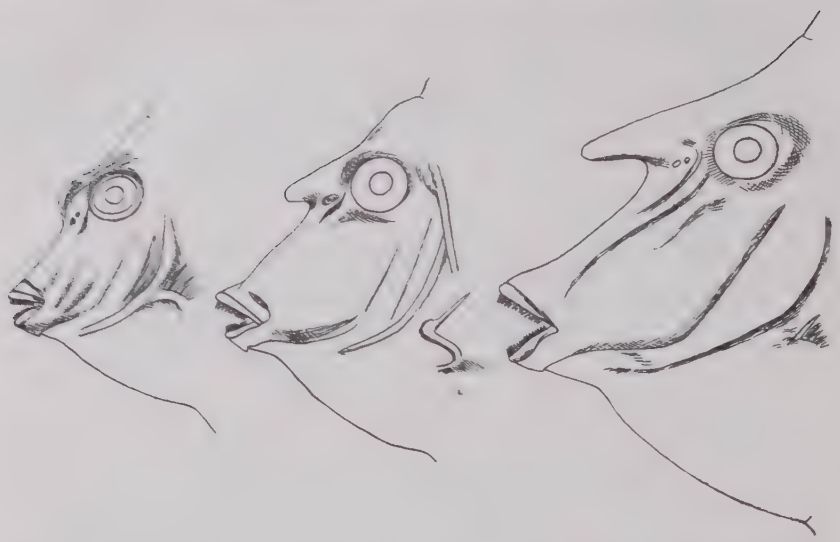


FIG. 2. *Naso unicornis* (Forskål); left lateral view of anterior part of head, to show stages in the development of the horn. (After Günther.)

1.65 times in the broadly keeled interorbital; in other large specimens the horn is much shorter than the snout; preorbital groove wide, deep, less than half an eye diameter in length; above it are the nostrils, the anterior one moderately large with a conspicuous white margin; mouth below axis of body, teeth about 20 on each side in upper jaw, their acutely pointed tips very finely serrate; posterior margin of preopercle begins behind lower part of eye and descends forward at an angle of 50°; the broad rounded angle of preopercle is far in advance of eye, in advance of the junction of snout profile and horn, its depth 1.8 times in head; dorsal spines stout and short in my largest specimen, evidently injured in early life and therefore abnormal, the first one longest, about 3.85 times in head; in a specimen, 95 millimeters long, the dorsal spines are half as long as the head; in two other large specimens the dorsal spines are all about the same length, about 2.3 times in head; the longest dorsal rays equal to or a fourth longer than the spines, becoming slightly and uniformly shorter in the posterior portion; anal spines much shorter, 4.92 times in head; anal rays equal those of soft dorsal; caudal peduncle flattened above and below, a fourth wider than its depth, which is 6.15 times in head; the large lunate caudal a little longer than head; in large old males the tips extend into elongate ribbonlike filaments, and the total length of caudal is then about 1.75 times in length and more

than twice head; pectoral 1.75 times in head; ventral spine 2.73 times in head, and a little shorter than first ray; two large oval bony plates on each side of caudal peduncle, the posterior one on base of caudal fin, the anterior one as long as eye; each plate armed with a very high, pointed, keen-edged keel, the tip curved a little forward.

The color in alcohol of one specimen very dark dusky brown on head and upper half of body, passing into pale brown spotted with darker violet-brown below median line, and cream along ventral region from throat to caudal, the fins all yellowish cream except caudal and anterior part of dorsal, which are light brown; dorsal and anal usually orange or yellowish, with longitudinal blue stripes, but these disappear in alcohol.

Other specimens are uniform violaceous gray above, passing into cream ventrally, without spots or markings; when fresh the caudal plates were a beautiful deep violet; the dorsal and anal marked by numerous obliquely longitudinal blue lines; the anal has a dark bluish marginal line; the caudal has a wide band of yellow on posterior margin, with a whitish terminal line.

Here described from a very fine specimen, 445 millimeters long, from Tandubas Island, Sulu Province, and two fine specimens, 336 and 345 millimeters long, from Bantayan Island. The Bureau of Science collection also contains a specimen, 95 millimeters long, which is like Plate 78, fig. B, in Günther's Fische der Südsee. I place here a specimen, 168 millimeters long, from Bungau, Sulu Province; it has no horn but the snout and coloration are characteristic. A short deep specimen, 138 millimeters long, from Honolulu, Hawaii, has the beginning of a horn in a triangular pointed hump before eyes. Its snout separates it at once from all other species. Previously recorded from San Fabian, Pangasinan, by Evermann and Seale, and listed by Günther from the "Philippine Islands" under the name *Naseus olivaceus*.

The shape and development of the horn and of the caudal plates vary greatly with age and have given rise to numerous names applied to various stages of growth.

This curious-looking fish is not often captured by Filipino fishermen, but ranges throughout the Islands. It occurs from the Red Sea to southern Japan and throughout Polynesia, from Hawaii to the Society Islands. It is easily distinguished by the very elongate cheeks and snout, which ordinarily project beyond the horn, even when it is long and well developed.

NASO TUBEROSUS Lacépède.

Naso tuberosus LACÉPÈDE, Nat. Hist. Poiss. 3 (1802) 111, pl. 7, fig. 3.
Naseus tuber CUVIER and VALENCIENNES, Hist. Nat. Poiss. 10 (1835) 214.
Naseus tuberosus GÜNTHER, Fische der Südsee 1 (1873) 123, pl. 80; DAY, Fishes of India (1878) 208.
Monoceros tuberosus SEALE and BEAN, Proc. U. S. Nat. Mus. 33 (1907) 247.

Dorsal V–27 to 30; anal II–27 or 28.

The elongate ovoid body laterally compressed, dorsal and ventral profiles alike and uniformly curved behind a line from origin of dorsal to ventrals; with age the anterior profile of snout develops a large, more or less projecting, convex and laterally compressed hump, which extends from eye to end of snout at base of upper lip, upper margin slightly inclined downward before dorsal and extending forward beyond eye 1.5 times the length of eye, then descending nearly vertically to lip; in young specimens the anterior profile describes a boldly convex curve from dorsal to upper lip; greatest depth opposite second anal spine, 2.34 times in length; head longer than deep, about 4.5 times in length; eye high up, 3.23 times in head; mouth small, low down, below median axis, teeth small, not serrate, 18 or 20 on each side of both jaws; the stout dorsal spines short in adults, from 2.5 to 3 or even 4 times in head, but in the young they may be 2 or 2.5 times in head, the fourth spine longest; anterior dorsal rays a little higher than longest dorsal spines, gradually decreasing posteriorly; anal uniformly curved like dorsal, but a little lower; depth of caudal peduncle 3.8 times in head; the wide caudal truncate or very little concave, the tips of its lobes never elongate, or filamentous, a sixth longer than head; the very broad short pectoral 1.3 times in head; first ventral ray 1.8 times in head; caudal spines well separated, small, the keeled spine not very high but sharp and strong.

Color gray or grayish brown, sprinkled everywhere with many small round blue spots, which become brown on dried specimens; dorsal and anal orange to brownish yellow, each with a pale blue basal stripe and a deep blue submarginal line, with a narrow colorless or white margin; pectoral brown with a posterior white marginal band, ventral yellow; caudal gray, edged with white posteriorly, the rays suffused with pink basally; sometimes large specimens have a large, clear, brown-spotted blotch under pectoral.

I have seen no specimens, but Seale and Bean had a specimen, 280 millimeters long, from Zamboanga. It attains a length of

over 600 millimeters, and is one of the largest acanthurids. It occurs throughout the tropical Indian Ocean, from Zanzibar, Mauritius, and Ceylon, to Aneitum, one of the New Hebrides, but it is doubtful if it extends farther eastward in the Pacific.

NASO VLAMINGII (Cuvier and Valenciennes). Plate 15, fig. 1.

Naseus vlamingii CUVIER and VALENCIENNES, Hist. Nat. Poiss. 10 (1835) 216; BLEEKER, Nat. Tijd. Ned. Ind. 4 (1853) 472; GÜNTHER, Fische der Südsee 1 (1875) 123, pl. 81; WEBER, Fische Siboga Exp. (1913) 320.

Dorsal VI or V–26 or 27; anal II–27 or 28.

The laterally appressed body elongate-ovoid, dorsal and ventral profiles not equally curved and alike, greatest depth at and behind posterior extremity of pectoral, 2.2 to 2.53 in depth, about 2.5 times in large adults; head more compressed laterally than body, very narrow anteriorly, anterior profile developed so that it is more or less elevated and lengthened until in adults the snout has a convex compressed hump which finally projects forward as far as a vertical from tip of upper lip; length of head a little more than its depth, 3.6 to 4.17 times in length, about 4 times in large adults; snout 1.5 to 1.6 times in head; the distance from eye to anterior tip of hump 1.66 to 1.7 times in head; eye far back, nearly circular, 4.1 to 4.33 times in head (less than 4 times in the young), 2.6 to 2.88 times in snout, and 1.3 to 1.6 times in the broad, elevated, more or less keeled interorbital; the small mouth terminal, with projecting lips, below median longitudinal axis, with 25 or 26 small, slender, pointed teeth on each side of upper jaw, their tips microscopically serrate; a curved groove passes downward and backward behind angle of mouth; origin of preopercular margin below level of eye or behind its lower part; angle of opercle beneath anterior margin of eye or before eye, its depth 2 to 2.25 times in head; the groove before eye curved, prominent, its length equal to or usually greater than an eye diameter, the posterior half very deep, above it are the inconspicuous nostrils, the posterior one very small, the larger anterior one below the posterior one so that they form a diagonal line; first dorsal spine stoutest, all spines equal, or the fourth or the sixth highest, first spine 1.77 to 2.5 times, the longest spine 1.46 to 1.77 times in head; soft dorsal elevated, middle rays longest, longest rays more than half the depth, sometimes equal to head, more often 1.16 to 1.4 times in head; first anal spine 3 times in head, and a little shorter than second; anal like soft dorsal, the anterior rays shorter than all but the very last, the longest rays 1.3 to 1.46

times in head; depth and breadth of caudal peduncle approximately equal, 5.4 to 5.6 times in head; posterior margin of caudal varies from straight to slightly concave, the angles more or less elongate in adults or becoming long and slender filaments, the caudal proper 4 times (less often 3.5) in length; with the elongated filaments included it is about 1.5 times in head and trunk; pectoral 1.3 to 1.46 times in head; ventral spine 1.6 to 1.77 times in head, and a little longer or shorter than first ventral ray; on each side of tail are two oblong rounded plates, the posterior one on base of caudal fin, each bearing a compressed keen-edged spine which may become elevated and a little produced anteriorly, base of anterior spine about two-thirds an eye diameter in length.

This is the most beautifully colored of all the acanthurids, and is distinguished by the richness and elegance of its quiet colors, which are subject to considerable variation, though always of the same general tints and patterns. A breeding female, 317 millimeters long, was very dark brown to blackish, the belly with a golden wash, the cheeks and throat old gold; the sides were covered with irregular vertical lines of a beautiful deep blue, these extending to anal on posterior part of body; under the pectoral was a broad irregular blotch of the same color; the upper part of body sprinkled with large blue dots, which become elongated below and pass into the vertical lines previously mentioned; the belly and breast were thickly covered with small blue dots, these larger and more scattered beneath pectoral; a few blue dots scattered over cheeks; a broad blue band across snout from eye to eye, a blue line beneath and behind eye to upper angle of opercle, and a blue band along margin of shoulder girdle; the dorsal and anal were black with a deep blue margin, blue rays, and a blue band below base of dorsal; the other fins black, the posterior margin of caudal golden.

In alcohol the color is uniform brown, with the blue lines and spots as given above; dorsal and anal violet-brown, pectoral chocolate brown, posterior margin of caudal yellowish brown.

Another specimen was blackish violet when alive, with very dark blue dots above and below on sides, and vertical lines of the same color along middle of body length; the dorsal and anal were blue-black, with deep blue rays, the violet-brown caudal with a white line on posterior margin.

In alcohol specimens vary from brown to violet-brown and deep chocolate brown, the blue spots and lines on sides becoming brown, violet-brown, or blue-black.

Here described from 7 specimens, varying from 150 to 322 millimeters in length, from the following localities:

Puerto Galera, Mindoro, 1.
Sibuyan, 1.
Culion, 1.
Zamboanga, Mindanao, 2.
Sibutu Island, Sulu Province, 2.

In the smallest specimen the hump on the snout is not developed, but is represented merely by a slight bulging.

This exceedingly handsome fish is distributed throughout the East Indies from Java to Amboina, and also occurs in the New Hebrides and Marshall Islands. Fowler has reported it from the "South Seas."

NASO GENIMARGINATUS Herre, sp. nov. Plate 16, fig. 2.

Dorsal VI–27 or 28; anal II–28 or 29.

The depth of the elongate, broadly fusiform, laterally compressed body about 2.6 times in length, the greatest depth from base of first or second dorsal ray; head longer than deep, laterally compressed toward tip of snout, 4 to 4.14 times in length, its upper profile more convex and less regular than the ventral profile from lower lip to ventrals; snout compressed before eyes, forming a wide long depression in which the nostrils are located, more or less boldly convex, 1.7 times in head; the nearly circular eye not placed high up, 5 to 5.4 times in head, about 3 times in snout and twice in the high, strongly convex interorbital; origin of preopercular margin is behind middle of eye and descends forward at an angle of 60°, its broadly curved angle below anterior margin of eye, depth of preopercle equal to interorbital; mouth moderate, terminal, on median axis of body, with about 40 minute teeth on each side of upper jaw, their elongate pointed tips more or less microscopically serrate; angle of mouth more or less concealed by the conspicuous curved margin of preocular; the diagonally curved groove before eye narrow but very deep and longer than eye; above it there is apparently but a single very large conspicuous white nostril of remarkable appearance, its length a third of an eye diameter, with numerous radial lamellæ; this extraordinary appearance is due to the ravages of parasitic entomostraca, several of which were found in the nasal cavity and preocular groove; by destroying the nasal membranous flaps the two nostrils would be thrown into one; the dorsal spines are all comparatively slender, the first or first and fourth longest, 2.4 to 3 times in head; dorsal low, the longest rays 2.6 to 2.8 times in head; anal spines short, 3.4 to 3.8 times in head, anal lower than dorsal, the longest rays

3 to 3.5 times in head; caudal peduncle very broad, flattened above and below, its depth 6.6 to 6.9 times in head and 1.4 to 1.68 times in its own width; the wide lunate or nearly straight-margined caudal a little longer than head, 3.66 to 4 times in length; pectoral 1.55 times in head, ventral 2.2 to 2.4 times; on each side of caudal peduncle are two large oval plates, equal to or longer than eye, each bearing a large keel which may be very high and sharp-edged, its height then equal to diameter of eye.

The color is very dark purplish brown above and on sides of head, lighter below and merging into gray along ventral and anal regions; opercle inclosed by a very broad chocolate brown band, which extends forward to apex of isthmus beneath chin; the dorsal has golden yellow spots and streaks on the membrane; anal and ventral golden yellow; posterior margin of caudal has a broad greenish yellow band; pectoral brown like body; tongue very deep blue-black or blackish purple, markedly different from that of other members of the genus.

In alcohol the yellow has disappeared and the vertical fins are purplish brown like the body.

Here described from the type, No. 14525, Bureau of Science collection, 452 millimeters long, and the cotype, No. 14526, 426 millimeters long, a spawning female, collected in July, 1926, on a reef near New Washington, Capiz Province, Panay.

Three specimens from 338 to 355 millimeters in length, from a reef near Ibahay, Capiz Province, Panay, have the dorsal 27 to 29; anal 28 to 30. The nostrils are normal for the genus, and the preocular groove is not noticeably deep; the teeth vary from about 35 to 40 on each side of the upper jaw. The breast of one specimen was evidently golden in life; in alcohol it has become yellowish gray. In other respects these specimens do not differ in any essential from the two described previously. A specimen, 395 millimeters long, from Bantayan Island, is plum-colored above, the caudal plates reddish violet, the anal golden.

I also have two specimens from Subic Bay, Olongapo, Zambales Province, Luzon, 255 and 364 millimeters long. The larger specimen has had the dorsal injured at some time, so that only the first and second spines are normal; the sixth one is poorly developed and the others are lacking.

A specimen, 316 millimeters long, from Sibuyan, has 7 dorsal spines.

All my specimens have been partially or wholly eviscerated, so that the number of pyloric cæca cannot be ascertained.

Gena, cheek; *marginatus*, bordered or inclosed.

NASO HEXACANTHUS (Bleeker). Plate 7, fig. 1.

Priodon hexacanthus BLEEKER, Nat. Tijd. Ned. Ind. 8 (1855) 421.
Naseus hexacanthus BLEEKER, Nat. Tijd. Ned. Ind. 12 (1856–1857) 233; GÜNTHER, Cat. Fishes 3 (1861) 355.

Dorsal VI–27; anal II–28.

The elongate ovoid body and head strongly compressed laterally, depth 2.3 times, head 3.75 times in length; dorsal and ventral profiles alike and uniformly curved from mouth to caudal peduncle; anterior dorsal and ventral profiles obtusely convex, depth of head less than its length; front line of snout below eyes descends almost in a straight line to mouth; snout 2.8 times in head; eye moderately large, twice in snout, 3.4 times in head, and 1.2 times in the high arched interorbital; posterior margin of preopercle begins behind pupil of eye, and descends anteriorly at an angle of 60°, its angle broadly obtuse, its depth 2.8 times in head; immediately in front of middle of eye begins a deep groove running downward and forward, its length less than an eye diameter; above it are the inconspicuous nostrils, the anterior one much larger than the posterior one, and with a broad brown marginal flap; mouth very small, terminal, on median axis of body, a thin diagonal groove passing downward and backward behind mouth at its posterior angle; teeth small, pointed, the tips of the upper ones microscopically serrate, the lower teeth blunter and apparently smooth, about 20 on each side of jaw; first dorsal spine stoutest, first and third longer than the others, twice in head; anterior dorsal rays a little shorter, decreasing gradually posteriorly, the last ray a little more than half the first spine; soft anal resembles dorsal but is lower, both fins angulate posteriorly; anal spines both broken in my specimen; caudal peduncle an eighth broader than deep, its depth 6 times in head; caudal lunate with pointed lobes, 3 times in length; pectoral small, 1.37 times in head; the very sharp ventral spine equals first ray in length, 1.7 times in head; each side of caudal peduncle has two small inconspicuous circular plates, the posterior one on base of caudal fin, each with a very low keel, a millimeter to a half millimeter in height; scales on top of snout a little coarser than those elsewhere.

Color in alcohol uniform dusky brown above, becoming paler below; the spinous dorsal has a narrow black margin, the membrane of both dorsal and anal dark brown, with 3 pale longitudinal bands on soft dorsal and 2 on anal, the bands probably blue in life; pectoral uniform brown, caudal dark violet-brown with a paler posterior margin.

Here described from a specimen, 180 millimeters long or 240 millimeters including caudal fin, collected at Mariveles, Bataan Province. This species has been known only from Bleeker's specimens; his description, based on 4 specimens from Amboina, 125 to 198 millimeters long including caudal fin, states that the caudal laminæ are not keeled, and the bands on the dorsal and anal are blue. Later Bleeker had specimens from the following localities, but gave no further description beyond his original one: Batu, one of the Batoe islands; Flores, Timor, and Ceram.

Since writing the above I have received a specimen, 148 millimeters long, from Bantayan Island. It is dark violet-gray above, shading into pallid purplish gray below; the bands on the dorsal and anal are more or less bluish; the caudal plates are scarcely or not at all keeled.

I have no doubt that my specimens are *P. hexacanthus* Bleeker.

Two specimens, 129 and 190 millimeters in length, from Cuyo, have the caudal plates very small, without true keels.

With some doubt I place here a specimen, 214 millimeters long, from Zamboanga. The dorsal is violet-brown, its anterior half with wide pale oblique stripes, which become three longitudinal stripes on the posterior half; the violet-brown anal has a basal longitudinal stripe and another on its lower portion; the stripes on both fins were evidently blue in life. There is a pair of caudal plates, each with a very low keel about a millimeter in height; on the left side of caudal peduncle, about an eye diameter in front of these, is another very small plate with a barely perceptible keel. In other respects it presents no essential difference from typical *N. hexacanthus*.

Dorsal VI–28; anal II–29.

NASO LITURATUS (Forster). Plate 16, fig. 1.

Harpurus lituratus FORSTER, Descrip. Anim. ed. Licht. (1844) 218.

Acanthurus lituratus BLOCH and SCHNEIDER, Syst. Ichth. (1801) 216; after Forster MSS.; JORDAN and SEALE, Bull. Bur. Fisheries 25 (1905) (1906) 358.

Aspisurus carolinarum QUOY and GAIMARD, Voy. Uranie, Zool. 2 (1824) 375, pl. 63, fig. 1.

Aspisurus elegans RÜPPELL, Fische des Rothen Meeres (1828) 61, pl. 16, fig. 2.

Prionurus eoume LESSON, Voy. Coquille, Zool. 2 (1830) 151.

Naseus carolinarum CUVIER and VALENCIENNES, Hist. Nat. Poiss. 10 (1835) 208; GÜNTHER, Cat. Fishes 3 (1861) 353; Fische der Südsee 1 (1875) 124, pl. 82.

Naseus carolinarum CUVIER and VALENCIENNES, Hist. Nat. Poiss. 10 (1835) 212.

Aspisurus lituratus RÜPPELL, Neue Wirbelt., Fische (1838) 130.
Monoceros lituratus SEALE, Occ. Papers Bishop Mus. 1 (1901) 113; SEALE and BEAN, Proc. U. S. Nat. Mus. 33 (1907) 247.
Callicanthus lituratus JENKINS, Bull. U. S. Fish Comm. 22 (1902) (1903) 481; JORDAN and EVERMANN, Bull. U. S. Fish Comm. 23[1] (1903) (1905) 404, pl. 60 and fig. 177.
Monoceros garretti SEALE, Occ. Papers Bishop Mus. 1 (1901) 112.

Dorsal VI–29 to 31; anal II–30 or 31; pyloric cæca 8.

Body laterally compressed, depth 2 to 2.2 times in length; head set obliquely, 3.42 to 3.5 times in length, more compressed than body; dorsal profile nearly straight, or may be concave behind tip of snout, slightly convex above eyes; snout thin, three-fourths as long as head, with projecting, rounded muzzle; eye high up, 4 to 4.5 times in head, 3 times or a little more than 3 times in snout, about 1.2 times in the low, broad, nearly flat interorbital; posterior margin of preopercle begins behind middle of eye and inclines downward and forward at an angle of 65°, its lower angle broadly convex and forward of eye, depth of preopercle 1.7 to 1.96 times in head; 14 to 16 small teeth on each side in upper jaw, their smooth flat tips round pointed; first spine the largest, 2 to 2.3 times in head, dorsal spines and rays gradually decreasing in height posteriorly, the fin low and angulate posteriorly; anal resembles dorsal in shape but is lower, first anal spine stouter than second, their height about equal, 3.25 to 3.5 times in head; caudal peduncle low, broad, flattened above and below, its depth 5.2 to 5.6 times in head; the lunate caudal a little longer or shorter than head, 3.27 to 4 times in length, or in males the upper and lower lobes may be extended into greatly elongated filaments; in a specimen, 210 millimeters long, the caudal filaments were 144 millimeters long, and 3.66 times the length of the middle caudal rays; the stout ventral spines equal or exceed the ventral rays, 1.73 to 1.8 times in head; pectoral 1.4 to 1.5 times in head; on each side of caudal peduncle 2 strong horny plates, each with a wide thin high-keeled spine, the posterior one on base of caudal fin; the caudal spines vary with age, becoming strongly curved forward with elongate sharp points, much longer than the basal width; in a young example, 93 millimeters long, the spines are not developed and the basal plates are but little evident; occasionally an adult specimen lacks one or two spines, on either or both sides; the prominent groove in front of eye is always less than an eye diameter in length; the 2 small but conspicuous nostrils close together, one behind the other, directly above the groove.

A specimen, 210 millimeters long, from Olongapo, had the body nearly uniform dusky, the belly suffused with faint golden yellow; a broad band of pale gold extended between eyes and upward and backward from eyes below first two dorsal spines; from lower anterior margin of eye a pale gold stripe curved forward and downward on snout ending behind angle of mouth; a white marginal band on upper and lower lips; each nostril with a white margin; the soft dorsal had a wide white border, with a narrow longitudinal lilac band below it, the rest of the fin black; basal half of anal was blackish, the outer half nearly half, with a black submarginal line; the caudal had a white terminal band, inside this a broader greenish yellow band; the plates on caudal peduncle golden, each set in a large golden patch fading to white marginally, the spines themselves yellow to nearly colorless at tip.

Another specimen, 204 millimeters long, from Ibahay, Panay, was dark olive, verging into greenish yellow on belly; a yellow band curved forward and downward from eye to behind mouth and a very broad greenish yellow band extended behind and above eyes, covering nearly all the interorbital region; the lips were red; the caudal spines were each set in a large golden red patch; the dorsal was black, with a white margin, much broader posteriorly; the anal was greenish yellow, then golden, with a black marginal line and a fine white edge.

A specimen, 240 millimeters long, from Bulalacao Bay, Mindoro, was dusky brown, a little paler below, belly and breast yellowish; the bands above eyes and on snout were golden; the lips were deep brick red; the caudal plates and spines were deep orange red, the plates surrounded by deep yellow; the dorsal was black, the soft dorsal with a bluish white marginal band; a basal band of lilac-blue below the soft dorsal; the anal was largely yellowish merging into orange on outer half, edged with a black line and a narrow marginal stripe of pale lilac.

Here described from 13 specimens, 93 to 245 millimeters in length, from the following localities:

Olongapo, Zambales Province, 2.
Balayan Bay, Batangas Province, 1.
Bulalacao Bay, Mindoro, 1.
Elefante, Marinduque Province, 4.
Tablas Island, 1.
Ibahay, Capiz Province, 1.
Bantayan Island, 3.

I have also seen specimens from the Manila market, Sibuyan Island, and various localities in the south.

This strongly marked species is found on coral reefs throughout the central and southern Philippines, and in some localities is abundant; the only previous Philippine record is that by Seale and Bean of a specimen "16 inches long" from Zamboanga.

I place here two specimens, 80 and 68 millimeters long, collected by R. C. McGregor at Guam and named *Monoceros garretti* by Seale. Each has a broad blue line running along the base of the dorsal and is the true form of *lituratus,* as Schneider's description says "margo interior et extimus pinnarum dorsalium et analis caeruleus;" *garretti,* distinguished by the absence of the blue line at the base of the dorsal, or dorsal and anal, does not seem to me to be a good species.

This fish is widely distributed, occurring from the Red Sea eastward throughout Polynesia to the Hawaiian and Society Islands. It is variable in color but the pattern and general effect are always the same. It reaches a length of 400 millimeters.

NASO LOPEZI Herre, sp. nov. Plate 7, fig. 2.

Dorsal V–31; anal II–30; pyloric cæca 2 + 2.

Body much elongated, fusiform, laterally compressed, mackerellike, the greatest depth at base of second dorsal ray, 3 to 3.3 times in length; dorsal and anal profiles alike, evenly and uniformly curved from snout to tail; head much more laterally compressed than body, 4 to 4.1 times in length; the convexly arched snout 1.56 to 1.6 times in head; eye high up, 4.33 to 4.5 times in head, 2.8 times in snout, and two-thirds as long as the broad, nearly flat interorbital; posterior margin of preopercle begins below level of eye and descends forward at an angle of 50°, its angle beneath nostrils, depth 2.5 times in head; the terminal mouth on the median axis, jaws equal, teeth small, with long, pointed, minutely serrate tips, 30 on each side in upper jaw; the preocular groove nearly horizontal, opposite middle of eye, its length half to three-fourths an eye diameter; the nostrils above it of nearly uniform size, the anterior one with a slight marginal flap; first dorsal spine longest and strongest, 2.4 times in head, the others progressively slightly shorter; dorsal low, angulate posteriorly, the longest rays 3.5 to 3.6 times in head; first anal spine 3.4 to 4 times in head, second spine

shorter and slenderer; anal rays like dorsal in shape and height; depth of caudal peduncle 5.2 to 5.6 times in head, less than eye, and less than its own breadth; caudal fin slightly lunate, the lobes more or less pointed, longer than head, 3.5 to 3.8 times in length; pectoral rather blunt, 1.6 to nearly 1.7 times in head; ventral spine and first ray about equal in length, about 2.5 times in head; on each side of caudal peduncle are two ovate bony plates, the posterior one partly on caudal fin, the anterior one well separated, each bearing a thin sharp-edged elevated keel, rounded in outline or the anterior margin vertical.

Color in alcohol rich brown or violet-brown above, paler on sides, grayish brown below and gray on throat; one specimen has the cheeks bright silvery; upper half of body thickly sprinkled with dark brown circular spots, not many below the median line, a few on opercles and preopercles; a very large irregular golden yellow blotch behind head and partly covered by pectoral; caudal thickly covered with brown spots like those on body, with a broad greenish yellow posterior marginal band, with a terminal white band; spinous dorsal covered with large violet-brown circular spots and irregular pale streaks; membrane of soft dorsal deep violet, or spotted like spinous dorsal; that of anal violet-brown, apparently with paler stripes; eye golden. In life the spots on sides and caudal were probably violet and the ventrals and pectorals were also violet, with a yellow bar on pectoral base.

Here described from the type, No. 14084, Bureau of Science collection, 370 millimeters long, and a cotype, 310 millimeters long, both from Ambil Island, in the China Sea southwest of Manila Bay; and a specimen, 386 millimeters long, from Bantayan Island. Both the specimens from Ambil Island were heavily infested with a nematode worm.

From Bulalacao Bay, on the southeastern coast of Mindoro, I have received a specimen, 156 millimeters long; dorsal V–29; anal II–28. The color is violet-gray above, paler below with a faint violet longitudinal bar along the middle; violet-brown spots thinly sprinkled over upper half; cheeks silvery; soft dorsal and anal are both edged with white and each has two longitudinal pale stripes, the spinous dorsal spotted and streaked with violet; posterior part of caudal greenish, edged with white.

Named for G. A. Lopez, collector of fishes for the Bureau of Science.

NASO THYNNOIDES (Cuvier and Valenciennes). Plate 7, fig. 3.

Axinurus thynnoides CUVIER and VALENCIENNES, Hist. Nat. Poiss. 10 (1835) 221, pl. 293; CUVIER, Règne Animal, Disciples ed. 8 (1836) pl. 74, fig. 3.

Naseus thynnoides BLEEKER, Act. Soc. Sci. Indo-Neerl. 2 (1857) Amboina, 61; GÜNTHER, Cat. Fishes 3 (1861) 355.

Dorsal IV–V, 28 or 29; anal II–28 to 30; pyloric cæca 3.

Body much elongate, almost fusiform, laterally compressed, depth 2.8 to 2.9 times in length; the blunt or somewhat pointed head longer than deep, 3.75 to 4 times in length; anterior dorsal and ventral profiles almost equally curved, the line from first dorsal to mouth uniformly and moderately convex, snout 2 to 2.25 times in head; the large circular eye placed well below profile, 1.5 to 2 times in snout, 3.3 to 3.9 times in head; interorbital high, convex, about 1.2 times eye, a rather prominent bony hump before upper part of eye; posterior angle of preopercle below middle of eye or sometimes anterior margin of pupil, its depth $3\frac{1}{3}$ to $3\frac{2}{3}$ times in head; posterior margin of preopercle beginning behind middle of eye and inclined downward and forward at an agle of 60°; the small terminal mouth below axis of body, its angle covered by the projecting preocular; teeth minute, 36 to 40 on each side of upper jaw, 26 to 30 in lower jaw; spinous dorsal variable, with either 4 or 5 spines, often irregularly developed, first spine strongest, first, fourth, and fifth (if present) usually equal in height, 2.7 to 2.8 times in head; soft dorsal higher than spinous, very little less in height posteriorly, angulate behind, the longest rays 2.2 to 2.4 times in head; anal spines short, 2.2 to 4 times in head; anal rays a little lower than soft dorsal, about 3 times in head; caudal peduncle constricted, its depth 6.8 to 7.2 times in head, its breadth a third greater than its depth; caudal more or less blunt, its upper lobe somewhat pointed, 3.5 to 3.6 times in length; on each side of base of caudal fin is an oval bony plate bearing a thin, very sharp, horny, platelike spine, which may be very large and more or less hooked forward; the size of these spines varies greatly in fishes of the same length; the ventral spine and first ray approximately equal in length, 2.7 to 2.8 times in head; pectoral rather small, a little more or less than 1.5 times in head; the groove in front of eye deep, little curved but nearly horizontal, its length 0.9 an eye diameter; nostrils inconspicuous, about equal in size.

Color uniform pale olive-brown above, merging into brownish gray on sides, breast and belly paler; dorsal and anal dark

brown, each with oblique yellow lines running upward and backward; caudal and pectoral both yellow; in my smallest specimen the color is dark violet-brown above, gray below; dorsal, anal, and caudal violet-brown to violet-black.

In alcohol the body color changes but little; the yellow lines on dorsal and anal fins are blackish, more or less vaguely marked with oblique lines; the yellow disappears from caudal and pectoral.

Here described from six specimens, 145 to 336 millimeters in length, one from Bulalacao Bay, Mindoro, two from Tablas Island, and three from Ibahay, Capiz Province, Panay. I find the teeth, under the compound microscope, more numerous than given by Bleeker, who gives them as 26 above, 20 below. According to him there are three blue lines on dorsal and anal; their exact color undoubtedly varies in different individuals. A fine specimen, 220 millimeters long, from Tablas Island, is purplish gray, dark above, pallid below, sides of head slate purple, posterior margin of caudal whitish. I also have two typical specimens from Mariveles, near the entrance of Manila Bay; they are 99 and 140 millimeters in length.

Two small specimens from Dumaguete, each 68 millimeters in length, show no trace of any caudal plates.

Cuvier and Valenciennes had a small specimen from New Guinea, and Bleeker three still smaller ones from Amboina. Günther does not state the size of his specimen, which was also from Amboina.

As the name indicates, this species has the shape of a scombroid fish.

ZANCLIDÆ

MOORISH IDOLS

The oblong or suborbiculate body is deep, the back much elevated, strongly compressed laterally, the skin firm, covered everywhere with minute, rough, shagreenlike scales which extend upon the basal portion of both dorsal and anal. The snout tubular, mouth small, with long, slender brushlike teeth; no teeth on palate; the bones of top of head thick and solid; the interorbital may be smooth or with a hump or conspicuous horn over each eye; a backward-curved spine may be present or absent above angle of mouth. Dorsal single, spines 7, the third long to exceedingly elongate and threadlike, the remaining ones suc-

cessively shorter; anal similar to soft dorsal, long, the anterior rays produced; anal spines 3, caudal peduncle not armed, the broad caudal fin lunate; pectoral short, ventrals pointed. Intestine long, with about 14 pyloric cæca; air bladder large; branchiostegals 4; vertebræ 9 + 13 = 22.

Jordan and Evermann state, "interspinal bone projecting before dorsal;" there is no projecting bone, and dissection reveals that the interneural is expanded forward to form a part of the high narrow predorsal ridge, covered with thick skin; they also say that there is a small antrorse spine before the anal, but my specimens show none. The first anal interhæmal spine is dilated and extends forward nearly to the somewhat distant anus, but it can hardly be called an antrorse spine, and is likewise covered with thick tough skin.

A small family of ornately colored fishes of bizarre shape, confined to the tropical parts of the Indian and Pacific Oceans, ranging northward to southern Japan. The Zanclidæ have an exaggerated chaetodont shape, and their habits are similar to those of the butterfly fishes, but their affinities are more with the Acanthuridæ. In the system they occupy a position between the Chaetodontidæ and the Acanthuridæ.

The strange name of Moorish idol was invented by Renard, who published in 1718 his natural history of the rarest curiosities of the Indian Sea, based upon figures and information obtained by Balthasar Coyotte, governor of Amboina. Some of the Molucca islanders made this extraordinary little fish the object of their superstitious reverence. If they happened to catch one they made obeisance, showed other signs of respect, and placed it back in the sea. The early travelers in the Orient applied the name of Moor to all Mohammedans, so that even to-day we have the fantastic appellation of Moro or Moor applied to Mohammedan Malays, though the Moors are really Caucasian natives of Morocco or their Arab conquerors.

Genus ZANCLUS (Commerson MS.) Cuvier and Valenciennes

Zanclus (Commerson MS.) LACÉPÈDE, Hist. Nat. Poiss. 5 (1804) footnote under *Chaetodon*, misprinted *Zanchus;* nonbinomial.

Zanclus (Commerson) CUVIER and VALENCIENNES, Hist. Nat. Poiss. 7 (1831) 77.

The characters of the single genus are included in the family diagnosis. Only two species are known, confused by most authors.

Key to the species of Zanclus.

a^1. A strong backward curved spine above angle of mouth..... **Z. canescens.**
a^2. No spine above angle of mouth; adults nearly always with a spine or hump over each eye..... **Z. cornutus.**

ZANCLUS CANESCENS (Linnæus). Plate 8.

Chaetodon canescens LINNÆUS, Syst. Nat. ed. 10 1 (1758) 272.
Zanclus centrognathus CUVIER and VALENCIENNES, Hist. Nat. Poiss. 7 (1831) 397.
Zanclus canescens GÜNTHER, Cat. Fishes 2 (1860) 493; BLEEKER, Atlas Ichth. 9 (1878) 366, pl. 4, fig. 3; WEBER, Fische Siboga Exp. (1913) 325.
Zanclus montrouzieri THIOLLIERE in Montrouzier, Fauna Woodlark (1856) 168.
Zanclus ruthiae BRYAN, Occ. Papers Bishop Mus. No. 4 2 (1906) 22, fig. 2.

Dorsal VII–38 to 41; anal III–32 to 35.

Body very deep, short, laterally compressed, back greatly elevated, breast and belly equally extended and semicircular, depth equal or almost equal to length; head compressed, its depth greater than its length, not drawn out into tubulate form anteriorly, 2.4 to 2.6 times in length, distance from posterior margin of preopercle to tip of snout 1.7 to 1.8 times in head; profile from origin of dorsal to below eyes a bold, very steep curve (undulate in one specimen), snout concave, short, deep, 1.66 to 1.8 times in head, not greatly extended beyond anterior dorsoventral profile; preorbital with a strong, sharp backward-curved spine above angle of mouth, its anterior base with two or three small pointed teeth before spine; eye high up, 2.85 to 3 times in head, 1.7 to 2 times in snout; the convex interorbital equals or is narrower than eye, without a horn or hump over eye; first and second dorsal spines very short, stout, acute; the very elongate third spine is prolonged into a thread and may be twice as long as head and body together; soft dorsal and anal shaped as in *Z. cornutus*, but third anal spine higher, 2 to 2.4 times in head; caudal peduncle 2.5 to 2.8 times in head; caudal slightly lunate, upper lip more or less extended, about 1.1 times in head; pectoral equals caudal; first ventral ray elongate, its tip filiform, equal to or a tenth longer than head.

Color in alcohol brown or brownish yellow, opercles and anterior half of body below level of eye bright silvery; a black band extends from spinous dorsal and above eyes to breast and behind anus, including all of eye except anterior margin; a narrower black band extends from tip of anterior dorsal rays

to lower margin of anterior two-thirds of anal; caudal blackish with a wide lunate pale yellowish or clear posterior marginal band; tip of snout and chin and lips black; ventrals and third dorsal spine black, the free tips of most of the dorsal rays and the posterior third of the anal rays white or yellowish.

Here described from two specimens, 61 and 52 millimeters long, from Legaspi, Albay Province, and two specimens, 50 and 52 millimeters long, from the Manila market. A comparison of this material with specimens of *Zanclus cornutus* of equal or smaller size leaves no doubt as to their specific difference. The snout and body are markedly different in shape, and the presence of the spines on the snout of *Z. canescens* is a character of which there is no trace in *Z. cornutus*. Weber had specimens, 70 and 80 millimeters long, which still showed the characteristic preorbital spine and lacked the frontomaxillary looped band typical of *Z. cornutus*.

This species occurs from Celebes and the Moluccas to the Santa Cruz Islands and Hawaii. A specimen was found in the stomach of a *Coryphaena* caught in 1° north latitude, 75° east longitude, Paris meridian.

ZANCLUS CORNUTUS (Linnæus). Plates 9 and 10.

Chaetodon cornutus LINNÆUS, Syst. Nat. ed. 10 1 (1758) 273; BLOCH, Ichtyologie 6 (1758) 52, pl. 200, fig. 2.

Zanclus cornutus CUVIER and VALENCIENNES, Hist. Nat. Poiss. 7 (1831) 78, pl. 177; GÜNTHER, Cat. Fishes 2 (1860) 493; THIOLLIERE, in Montrouzier, Fauna Woodlark (1857) 167; DAY, Fishes of India (1878) 111, pl. 28, fig. 4; BLEEKER, Atlas Fishes 9 (1878) 77, pl. 366, figs. 1 and 2; JORDAN and EVERMANN, Fishes N. and Mid. America 2 (1898) 1687; JORDAN and RICHARDSON, Bull. Bur. Fisheries 27 (1907) (1908) 269; WEBER, Fische Siboga Exp. (1913) 325.

Zanclus canescens JORDAN and FOWLER, Proc. U. S. Nat. Mus. 25 (1902) 549; JORDAN and EVERMANN, Bull. U. S. Fish Comm. 23[1] (1903) (1905) 382, pl. 57.

Visayan name, *kalmin-kalmin*.

Dorsal VII–39 to 41; anal III–31 to 33.

Body very deep, short, oblong, laterally compressed, back elevated, depth 1.12 to 1.3 times in length; head compressed, drawn out into a tubulate pointed snout, 2.25 to 2.5 times in length, its depth less than its length; from posterior margin of preopercle to tip of snout 1.3 to 1.4 times in head; profile from origin of dorsal to eyes descends obliquely and very steeply; interorbital concave, with a hump or a pointed, outward-

curved horn above each eye, the size of the horn varying greatly; below eyes snout very concave, with long, conical, produced jaws, projecting far beyond anterior dorsoventral profile, 3.1 to 3.5 times in length and 1.35 to 1.45 times in head; mouth small, jaws equal, with long slender pointed teeth; eye high up, 4 to 5 times in head, 3 to 3.6 times in snout, proportionately larger in the young; the concave interorbital equals or slightly exceeds eye, measured above eye, and is less than eye measured in front of eye; first and second dorsal spines very short, stout, acute; third spine long to exceedingly elongate with thread-like tip, sometimes 1.5 times the length of head and body; fourth to seventh spines successively much shorter, fourth less than half as long as third, seventh longer than head; dorsal rays high at first, the first and second longer than head, the others diminishing rapidly in height, those of posterior half very short; first and second anal spines very short, strong, acute, third 2.5 to 3 times in head; anal rays high anteriorly, posterior half of fin very short, second to fourth rays 1.4 to 1.8 times in head, the others successively much shorter; caudal peduncle strong, 3 to 3.3 times in head; caudal rather broad, its posteror margin nearly truncate or very slightly lunate and upper tip the longer, its length 1.2 to nearly 1.5 times in head; pectoral shorter than caudal, 1.43 to 1.5 times in head; the pointed ventral 1.5 to 1.7 times in head.

In life the body is bright canary yellow (less often yellow shading into white, rarely pearly white), with two wide black or dark brown crossbands; the anterior one extends from first or second dorsal spine to supraorbital horns and down to breast and behind anus, including ventrals, its anterior margin bounded by a blue or pearly white stripe; on lower half are two blue lines, one from origin of ventrals to gill opening and up behind eye to median line before first dorsal; the second blue line begins behind anus, goes up to base of pectoral, passes forward of this and up to origin of dorsal; a third line extends from upper margin of eye up to median line of head where it meets its fellow in a long acute angle; from upper anterior margin of eye a blue line curves up behind base of supraorbital horn and curves down to the middle of the space between the horns to meet its fellow; the posterior black band extends from tip of anterior dorsal rays across body to lower margin of greater part of anal, widest below, a blue line extending across

its posterior part; a wide black band covers most of caudal, bounded posteriorly by a crescent-shaped blue or white band, the wide margin yellowish.

A black or deep brown band extends from interorbital space down snout to its tip; a stripe passes from it down side of snout and curves up back on tip of snout, inclosing a roughly triangular yellow area, the stripe margined below by a pearly white or bluish line; a large black or deep brown spot on lower lip and jaw; pectorals pale yellowish, ventrals very dark brown or black; soft dorsal and anal edged with black.

In alcohol the yellow fades to white or very pale brownish yellow, and the blue also usually turns to white; the dark cross-bands usually become paler than in life.

In addition to observing a number of living specimens in the Bureau of Science aquarium, I have examined the following alcoholic specimens, ranging in length from 47 to 150 millimeters:

Basco, Batan Island, Batanes Province, 1.
Olongapo, Zambales Province, 3.
Monja Island, just outside the entrance to Manila Bay, 2.
Mariveles Bay, Bataan Province, 1.
Calapan, Mindoro, 1.
Bulalacao Bay, Mindoro, 2.
Elefante Island, 7.
Simara Island, 1.
New Washington, Panay, 2.
Estancia, Panay, 2.
Tagapula Island, 2.
Carnasa Island, 2.
Clarendon Bay, Balabac, 1.
"Philippines," 7.

My specimens from Monja Island, a male 143 millimeters and a female 133 millimeters long, collected on April 23, 1922, were ready to spawn.

This striking-looking and gorgeously colored little fish, of stately demeanor and grotesquely comical countenance, is common on rocky reefs throughout the entire Philippines. The only previous Philippine record is by Jordan and Richardson, who had specimens from Fuga Island, north of Luzon, and Cagayancillo, in the Sulu Sea.

My smallest specimens, 47, 56, 57, 61, and 62 millimeters in length, have the head, snout, form, and color markings identical in every respect with those of the largest specimens. The horns above the eyes do not begin to develop until the fish is about 75 millimeters long, and their development varies greatly in adult specimens of the same size. One specimen 130 milli-

meters long has no horns, while other specimens two-thirds as large have large horns. The presence or absence of horns above the eyes is therefore not a specific character.

Even the smallest specimens are entirely distinct from *Z. canescens*, which cannot be considered as the young of *Z. cornutus*.

This species has an enormous range, occurring from Zanzibar and the east coast of Africa to the Hawaiian, Samoan, and Tonga Islands, and on eastward to the Revillagigedo Islands off the coast of Mexico. Cuvier and Valenciennes had specimens, 250 millimeters in length, but state that it becomes larger.

ILLUSTRATIONS

PLATE 1

FIG. 1. *Acanthurus triostegus* (Linnæus). (Drawing by Jose Nievera.)
2. *Acanthurus bariene* Lesson. (Drawing by A. L. Canlas.)

PLATE 2

FIG. 1. *Acanthurus achilles* Shaw. (Drawing by Jose Nievera.)
2. *Acanthurus aliala* Lesson. (Drawing by Jose Nievera.)

PLATE 3

FIG. 1. *Acanthurus atramentatus* (Jordan and Evermann). (Drawing by Pablo Bravo.)
2. *Acanthurus marginatus* Cuvier and Valenciennes. (Drawing by Pablo Bravo.)

PLATE 4

FIG. 1. *Acanthurus nigroris* Cuvier and Valenciennes. (Drawing by Pablo Bravo.)
2. *Acanthurus mindorensis* Herre, sp. nov. (Drawing by Jose Nievera.)

PLATE 5

FIG. 1. *Acanthurus philippinus* Herre, sp. nov. (Drawing by Pablo Bravo.)
2. *Naso brachycentron* (Cuvier and Valenciennes). (Drawing by Pablo Bravo.)
3. *Naso brevirostris* (Cuvier and Valenciennes). (Drawing by Pablo Bravo.)

PLATE 6

FIG. 1. *Naso unicornis* (Forskål). (Drawing by Pablo Bravo.)
2. *Naso marginatus* (Cuvier and Valenciennes). (Drawing by A. L. Canlas.)

PLATE 7

FIG. 1. *Naso hexacanthus* (Bleeker). (Drawing by A. L. Canlas.)
2. *Naso lopezi* Herre, sp. nov. (Drawing by A. L. Canlas.)
3. *Naso thynnoides* (Cuvier and Valenciennes). (Drawing by Jose Nievera.)

PLATE 8

Zanclus canescens (Linnæus); young, natural size. (Drawing by A. L. Canlas.)

PLATE 9

Zanclus cornutus (Linnæus); young, natural size. (Drawing by Jose Nievera.)

PLATE 10

Zanclus cornutus (Linnæus). (Drawing by Jose Nievera.)

PLATE 11

Zebrasoma veliferum (Bloch). (Drawing by Jose Nievera.)

PLATE 12

FIG. 1. *Acanthurus olivaceus* Bloch and Schneider. (Drawing by Jose Nievera.)
2. *Acanthurus gahm* (Forskål). (Drawing by Pablo Bravo.)
3. *Acanthurus leucocheilus* Herre, sp. nov. (Drawing by A. L. Canlas.)

PLATE 13

FIG. 1. *Acanthurus celebicus* Bleeker. (Drawing by Pablo Bravo.)
2. *Ctenochaetus striatus* (Quoy and Gaimard). (Drawing by Pablo Bravo.)
3. *Paracanthurus lambdurus* (Gill). (Drawing by Jose Nievera.)

PLATE 14

FIG. 1. *Acanthurus lineatus* (Gmelin). (Drawing by M. Nievera.)
2. *Acanthurus bleekeri* Günther. (Drawing by Jose Nievera.)
3. *Acanthurus dussumieri* Cuvier and Valenciennes. (Drawing by A. L. Canlas.)

PLATE 15

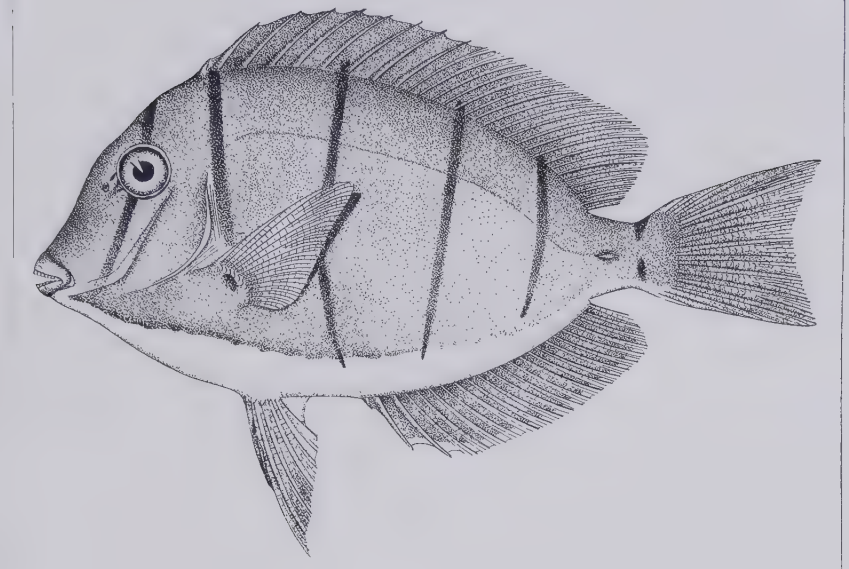
FIG. 1. *Naso vlamingii* (Cuvier and Valenciennes). (Drawing by M. Nievera.)
2. *Ctenochaetus strigosus* (Bennett). (Drawing by A. L. Canlas.)
3. *Ctenochaetus strigosus* (Bennett), a frightened fish exposed to light. (Drawing by A. L. Canlas.)

PLATE 16

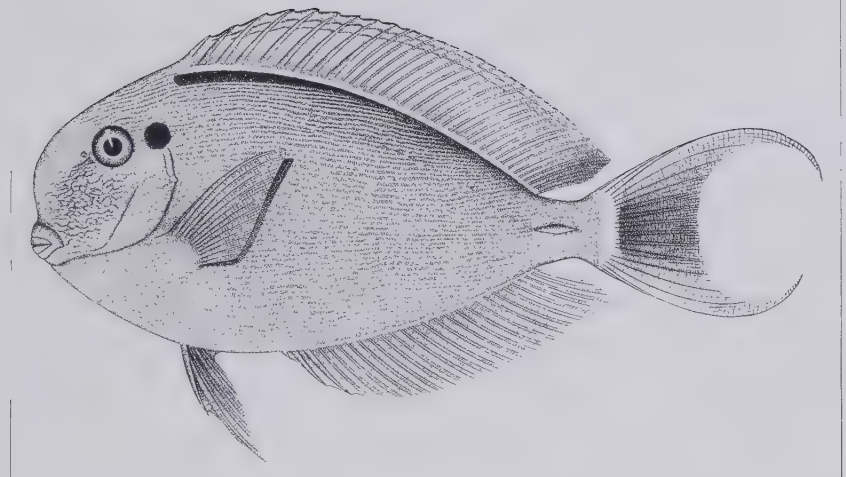
FIG. 1. *Naso lituratus* (Forster). (Drawing by Jose Nievera.)
2. *Naso genimarginatus* Herre, sp. nov. (Drawing by A. L. Canlas.)
3. *Acanthurus matoides* Cuvier and Valenciennes. (Drawing by A. L. Canlas.)

TEXT FIGURES

FIG. 1. *Naso marginatus* (Cuvier and Valenciennes); anterior view.
2. *Naso unicornis* (Forskål); left lateral view of anterior part of head, to show stages in the development of the horn. (After Günther.)

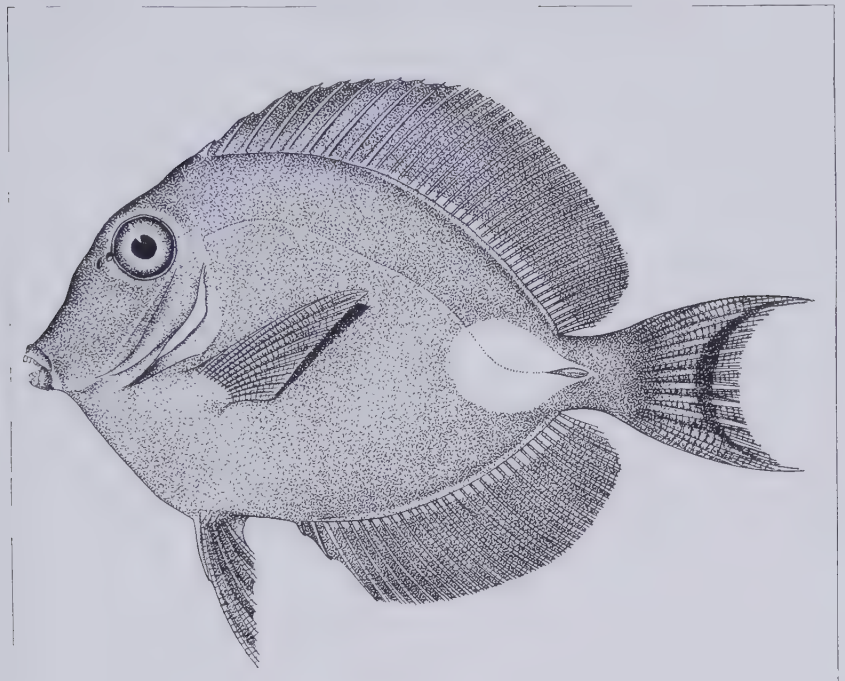


1

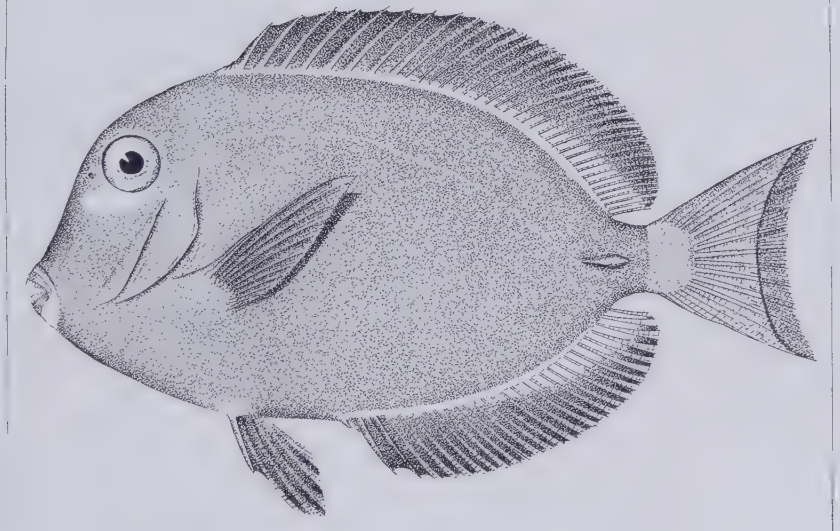


2

PLATE 1.

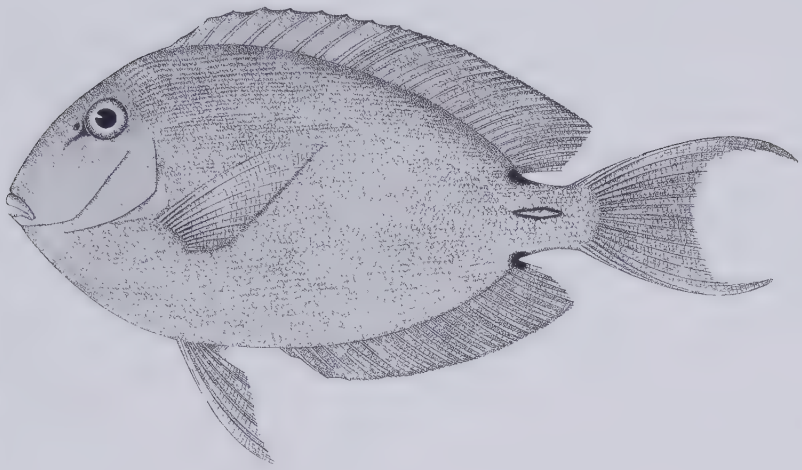


1

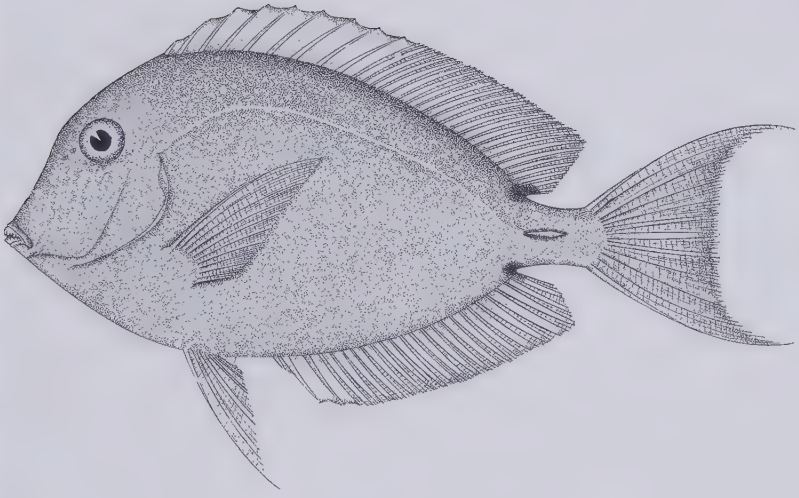


2

PLATE 2.

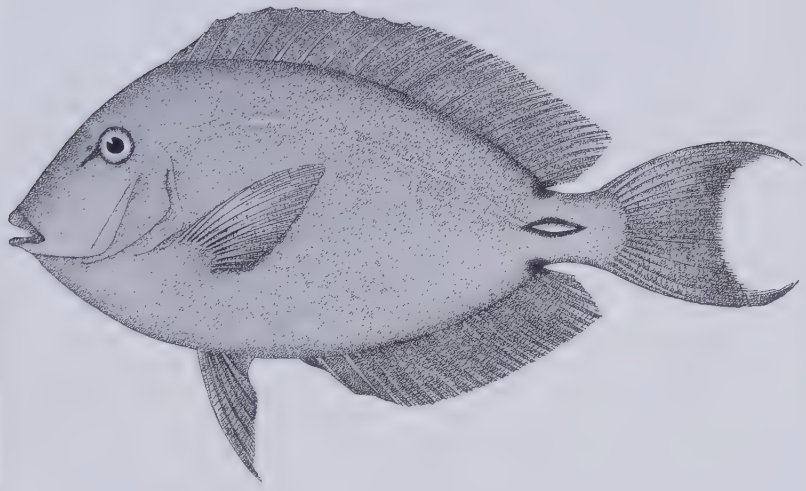


1

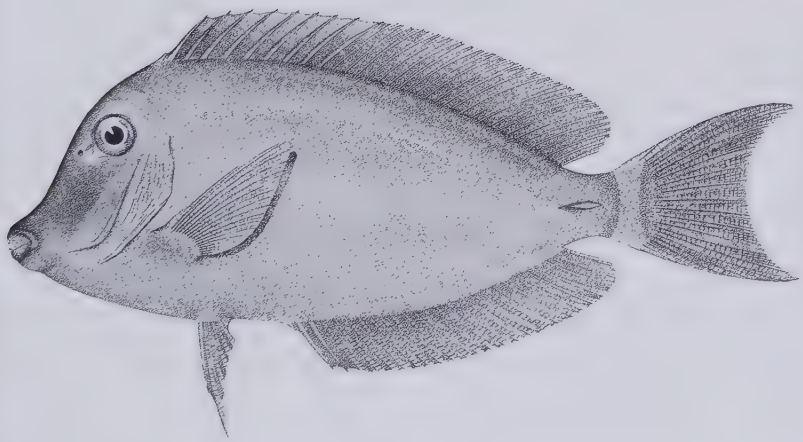


2

PLATE 3.

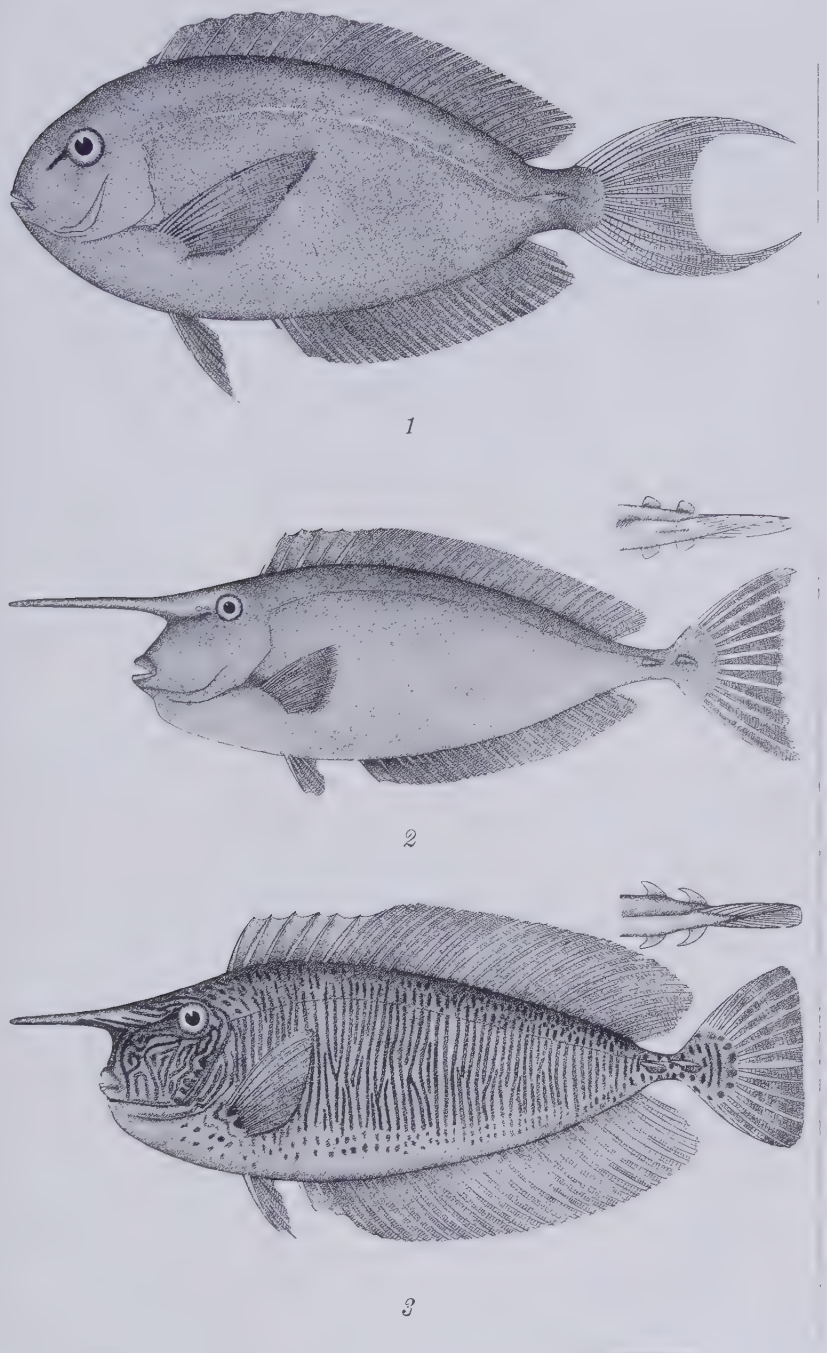


1



2

PLATE 4.

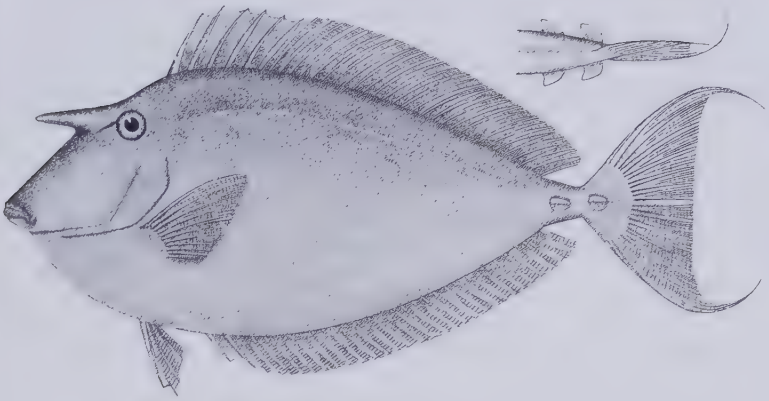


1

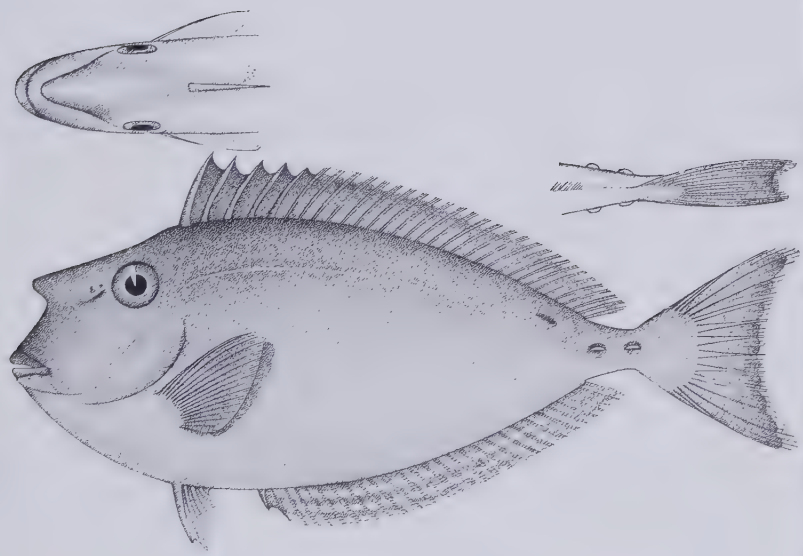
2

3

PLATE 5.



1



2

PLATE 6.

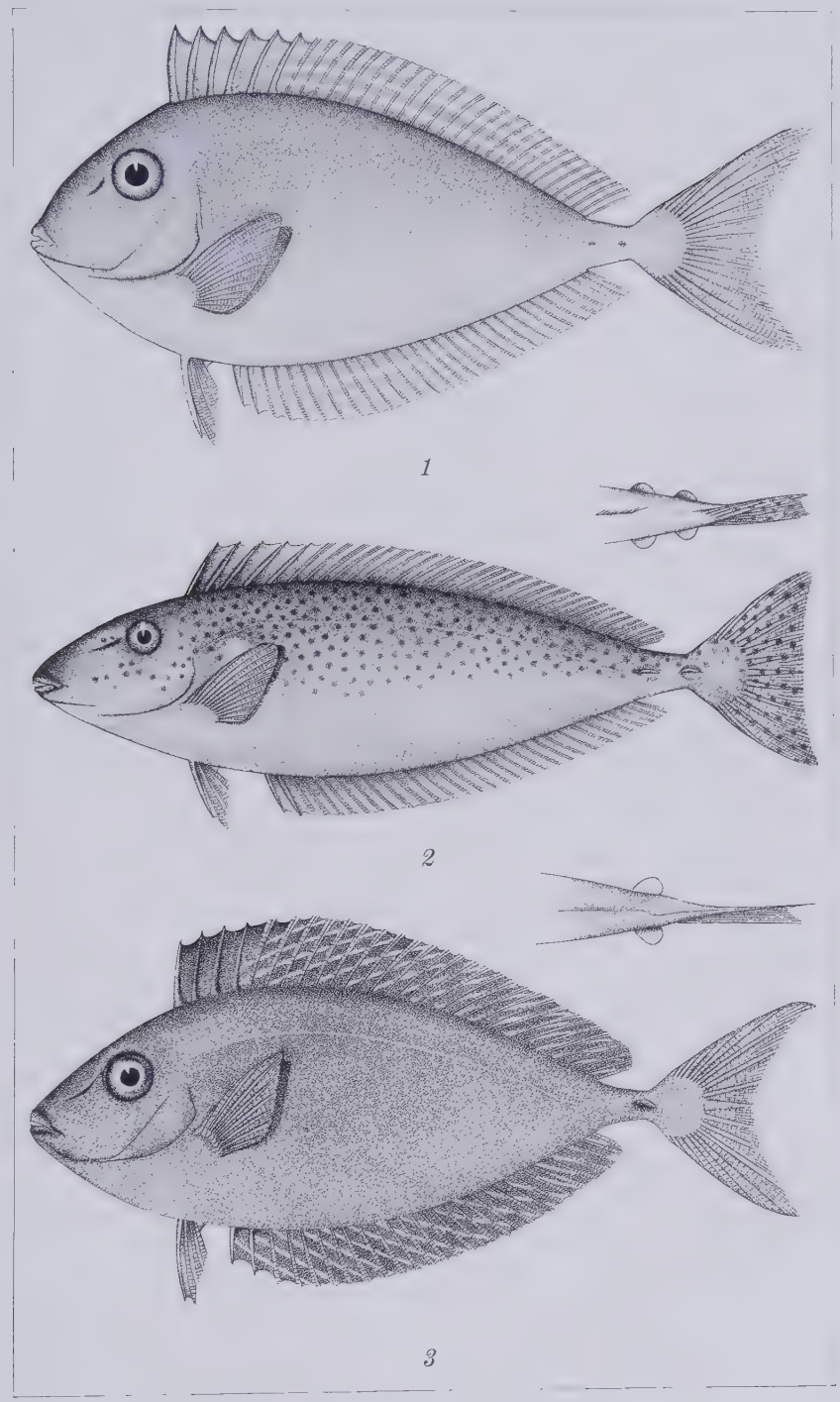


PLATE 7.

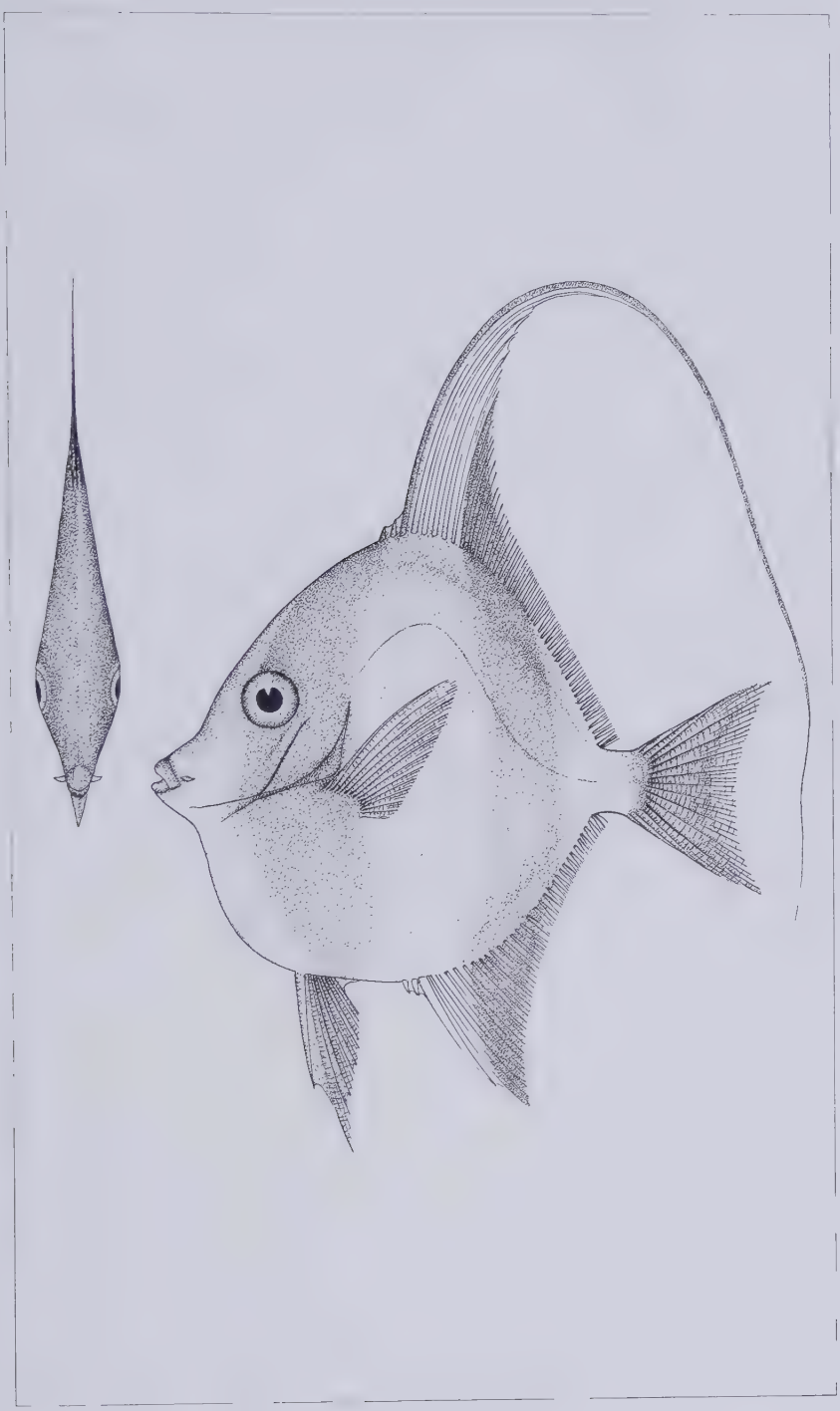


PLATE 8. ZANCLUS CANESCENS (LINNÆUS).

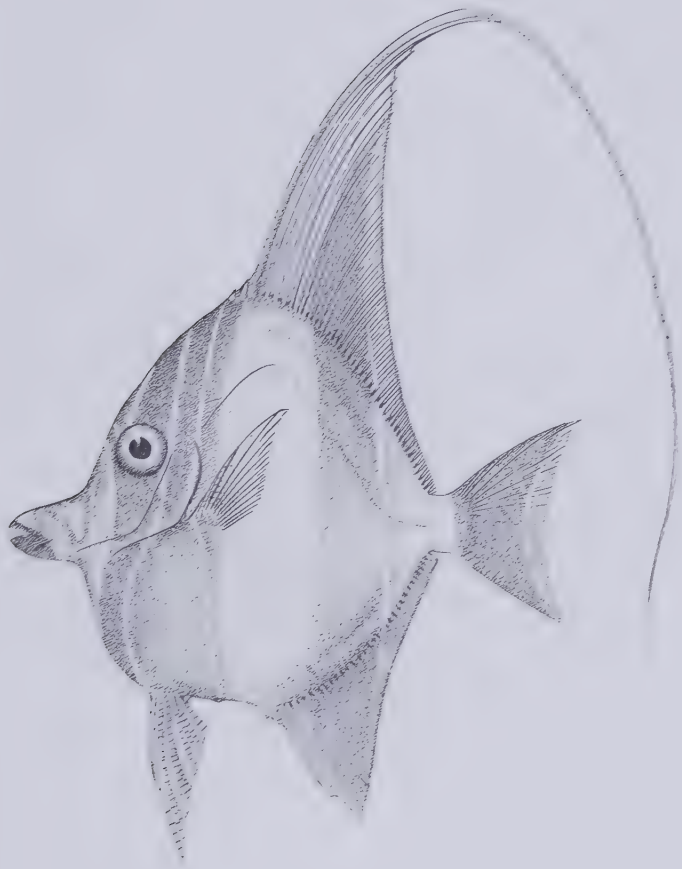


PLATE 9. ZANCLUS CORNUTUS (LINNÆUS).

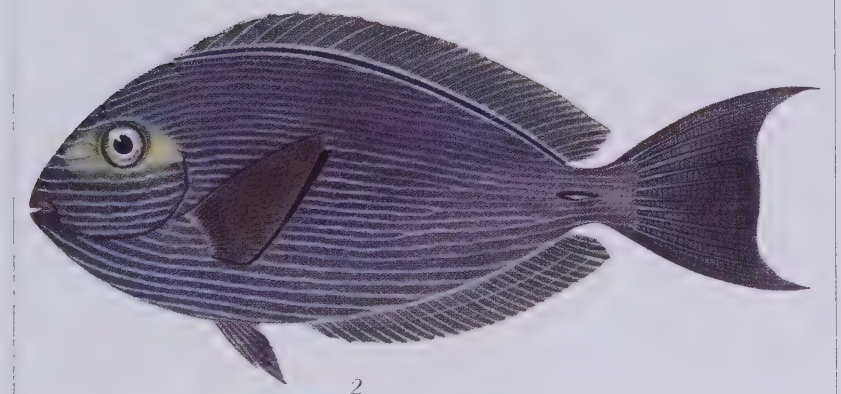
PLATE 10. ZANCLUS CORNUTUS (LINNÆUS).

PLATE 11. ZEBRASOMA VILIFERUM (BLOCH).

PLATE 12.

PLATE 13.

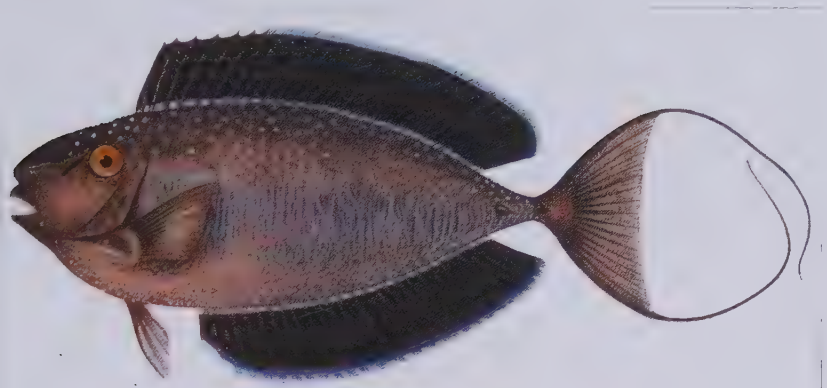
1



2

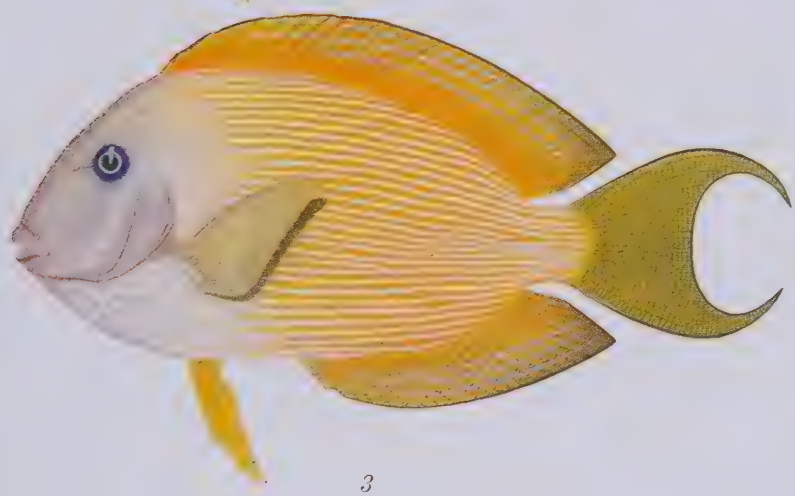
3

PLATE 14.



1

2



3

PLATE 15.

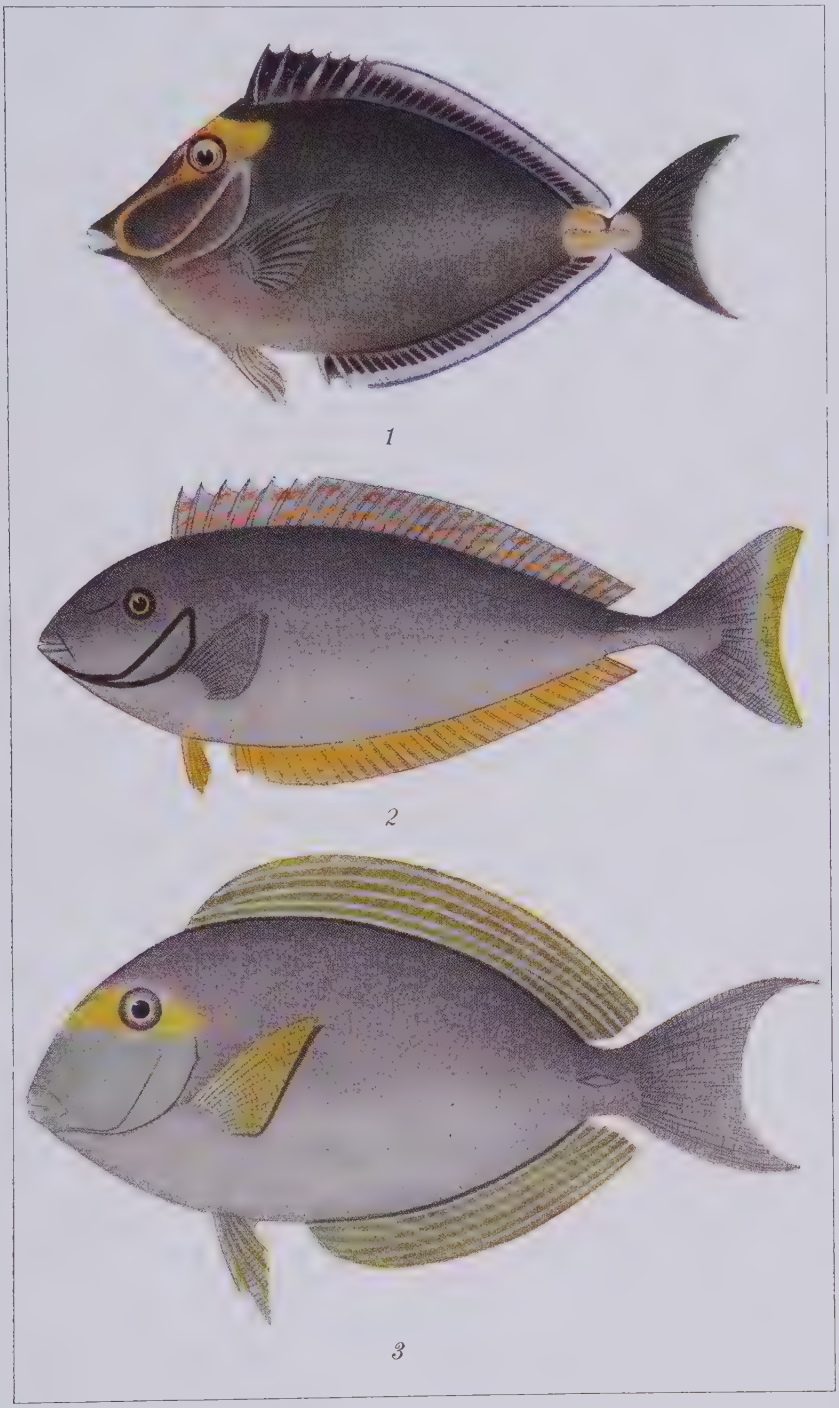


PLATE 16.

ERRATA

VOLUME 33

Note.—Dans la description du *Ceratosolen imbecillus* sp. nov., p. 315, j'ai donné erronément l'antenne de la femelle composée de 10 articles, au lieu de 11, et j'ai decrit pour 4^{me} article le 5^{me}. Le 4^{me} article, au contraire, est trés petit mais distinct.

Ceci posé, *C. imbecillus* est presque certainement synonyme de *C. hewitti* Waterst. de l'Ile de Borneo.

(Sgd.) G. GRANDI

VOLUME 34

Page 14, line 14 from bottom, *for* CHELMON BOSTRATUS *read* CHELMON ROSTRATUS.

INDEX

[New generic and specific names and new combinations are printed in **boldface;** synonyms and names of species incidentally mentioned in the text are printed in *italic.*]

A

Abdastartus Dist., 307.
muiri Drake, **307.**
tyrianus Dist., 307, 308.
Acanthocepola Bleeker, 281.
abbreviata (Cuv. & Val.), 282.
krusensterni Jordan and Fowler, 283.
krusensterni (Schlegel), 282, 283.
Acanthochætodon Bleeker, 81.
imperator Bleeker, 97.
nicobariensis Bleeker, 98.
semicirculatus Bleeker, 100.
Acanthuridæ, 403.
Acanthurus Forsk., 404, 405, 435, 441.
achilles Shaw, 406, 414.
agaña Seale, 441.
aliala Lesson, 406, 416.
altivelis Cuv. & Val., 441.
annularis Cuv. & Val., 430.
annulatus Fowler and Bean, 452, 454.
atramentatus (Jordan & Evermann), 406, 422.
bariene Lesson, 405, 409.
bipunctatus Gthr., 428.
bleekeri Gthr., 406, 423.
blochi Benn., 432, 443.
blochi Cuv. & Val., 430.
brevirostris Jenkins, 450.
celebicus Bleeker, 406, 417.
ctenodon Cuv. & Val., 438.
dussumieri Cuv. & Val., 406, 425.
eparai Lesson, 413.
flavescens E. T. Benn., 441.
gahm Cuv. & Val., 405, 411.
gahm (Forsk.), 411.
glaucopareius Cuv. & Val., 416.
guntheri, 432.
guttatus Kittl., 427.
hepatus Bl., 435.
hepatus Cuv. & Val., 435.
hirudo J. W. Benn., 407.
humeralis Cuv. & Val., 413.
hypselopterus Bleeker, 443.
leucocheilus Herre, **406, 419.**
lineatus Bl. & Schn., 406, 420.
lineatus (Gmel.), 420.
lineolatus Gthr., 422.
lituratus Bl. & Schn., 464.
marginatus Cuv. & Val., 406, 427.
Acanthurus Forsk.—Continued.
mata Bleeker, 423.
matoides Cuv. & Val., 407, 430, 432, 433.
mindorensis Herre, **407, 433.**
nigroris Cuv. & Val., 406, 428.
nigros Gthr., 428.
nummifer Cuv. & Val., 409.
olivaceus Bl. & Schn., 405, 413.
philippinus Herre, **407, 434.**
rhombeus Kittl., 441.
sandvicensis (Streets), 409.
scopas Cuv. & Val., 441.
striatus Quoy & Gaimard, **437, 440.**
strigosus Benn., 438.
subarmatus F. D. Benn., 407.
tennenti Gthr., 411.
triostegus Bl. & Schn., 405, 407.
triostegus (Linn.), 407.
unicornis Shaw, 455.
velifer Bl., 443.
virgatus Vaillant & Sauv., 441.
vittatus Benn., 420.
zebra Lacép., 407.
Acronorus, 404.
Acronurus, 403.
Acrophorus assamicus Bedd., 241.
Acrosorus, 260.
Adiantum repens L. f., 253.
Aëdes, 118.
ægypti, 131, 132, 138.
Aglaomorpha, 260.
Akikiro, 8.
Alcohol addition products of the bromo derivative of mixed ethers and bromo derivative of diphenyl-isopropyl ether, 153.
Alibang-bang, 81.
Alibangbang, 20.
Alophorophasia T. T., **373.**
alata T. T., **373, 374.**
Alsó, 294.
Ambassis batjanensis Bleeker, 296, 303.
urotaenia Bleeker, 296, 300, **303.**
Amia hyalosoma Bleeker, 296, 303.
Anabas testudineus (Bl.), 303.
Anay, 147.
Androcyptera T. T., **372.**
anorbitalis T. T., 372, **373,**
Angel fish, 81.
Anguilla mauritiana Benn., 294, 296, 303.
Anthus gustavi Swinhoe, 212.

Apahap, 302.
Aparrius acutipinnis (Cuv. & Val.), 295, 297.
Aphrimyobia **japonica T. T., 396.**
simillima T. T., 396.
Aplonis atrifusca, 208.
brevirostris, 214.
Araiostegia Copel., **240**, 244.
athamantica (Christ) Copel., 241.
clarkei (Baker) Copel., 241.
hymenophylloides Copel., **241**, 242.
multidentata (Wall.) Copel., 241.
parvipinnula (Hayata) Copel., 241, 242.
pseudo-cystopteris (Kze.) Copel., 241.
pulcherrima (Baker) Copel., 241.
pulchra (Don) Copel., 241, 242.
yunnanensis (Christ) Copel., 241.
Artamides striatus (Bodd.), 217.
Artamus leucorynchus (Linn.), 217.
Arthropteris, 239.
Asbellopsis T. T., 378.
luzonensis T. T., 378, 379.
Asohos, 302.
Aspidium hymenophylloides Blm., 241.
multidentatum Wall., 241.
Aspirurus unicornis Rüpp., 455.
Aspisurus carolinarum Quoy & Gaimard, 464.
elegans Rüpp., 464.
lituratus Rüpp., 465.
Astur sp., 208, 217, 228.
Axinurus thynnoides Cuv. & Val., 469.

B

Baclad, 54.
Bagaoñg, 302.
Baklad, 290.
Bakwak, 455.
Balantium, 254.
dubium, 242.
Banak, 294, 299.
Band fishes, 281.
Bañglis, 302.
Bañgos, 302.
Barbodes hemictenus Jordan & Richardson, 303.
Barydexia T. T., 379.
bivittata T. T., 379, 380.
Batrachostomus microrhynchus Gr., 207.
Bayang, 3, 8.
Bebang, 20.
Belobranchus belobrancha Cuv. & Val., 303.
BERNHAUER, MAX, Die Staphyliniden der Philippinen; 24 Beitrag zur Indo-Malayischen Staphylinidenfauna, 399.
Biang puti, 295.
BIROSEL, D. M., Alcohol addition products of the bromo derivative of mixed ethers and bromo derivative of diphenyl-isopropyl ether, 153.
Bobo, 301.
Bombonia Herre, **274.**
luzonica Herre, **275**, 296.
Boophilus australis, 132, 138.
Boray-boray, 81.
Botria, 389.
Botriopsis T. T., 389.
bakeri T. T., 389, 390.
Brachyceraea v. Röd., 331, 332.
obscuripennis Kröb., 333.
Brachymeropsis T. T., 396.
luzonensis T. T., 396.
sumatrensis T. T., 396.
Buan buan, 295, 302.
Bubulcus coromandus (Bodd.), 224.
Butterfly fishes, 13, 20.

C

Cabcabalan, 407.
Calisitta ænochlamys (Sharpe), 217.
Callicanthus Swainson, 446.
lituratus Jenkins, 465.
Calotheresia, 379.
bivittata T. T., 380.
formosensis, 380.
sumatrensis, 380.
Calymmodon, 259, 260.
clavifer (Hook.) Moore, 261, 268, 269.
conduplicatum (Brause) Copel., **268.**
conduplicatus, 261.
cucullatus (Nees & Blm.) Presl, **261, 263**, 264, 266, 267.
glabrescens Copel., **261, 263.**
gracilis (Fée) Copel., **261**, 264, **266**, 267.
hirtus Brack., 266.
hyalinus Copel., **261, 264.**
hygroscopicus Copel., **261, 265.**
latealatus Copel., **261, 265.**
mnioides Copel., **261, 267**, 268.
muscoides Copel., 261, **264**, 265.
ordinatus Copel., **261, 267.**
pergracillimus (v. A. v. R.) Copel., **261**, 263.
Caprimulgus sp., 208.
Caranx, 293.
ignobilis (Forsk.), 294, **296.**
marginatus Gill, 294, **296**, 301, 303.
Carcharhinus gangeticus Müll. & Henle, 298, 303.
sp., 296.
Catalinovoria, 395.
Centropus sinensis (Steph.), 207.
Centropus sinensis (Steph.), 207.
Centropyge Kaup, 81.
tibicen Kaup, 90.
Cepola, 281.
abbreviata Cuv. & Val., 282.
krusensterni Schlegel, 283.
Cepolidæ, 281.
Ceyx melanura Kaup, 207, 210.
Chætodon Artedi, 14, 19, 29, 71–73, 75, 471.
(Artedi) Linn., 19, 109.
abhortani Cuv. & Val., 44.
acuminatus Linn., 76.
adiergastos Seale, **22**, 50, 109.
argentatus Sm. & Radcliffe, 21, 33, 109.
argus Bodd., 8.
atromaculatus **Benn., 8.**
auriga Forsk., 21, 29, 109.
aurora **De Vis, 46.**

Chætodon Artedi—Continued.
austriacus Rüpp., 63.
baronessa Cuv. & Val., 26.
bella-maris Seale, 22, 49, 109.
bennetti (Bleeker), 23, 68.
bennetti Cuv. & Val., 65, 110.
bicolor Bl., 91.
bifascialis Cuv. & Val., 24.
biocellatus Cuv. & Val., 52.
canescens Linn., 472.
carens Seale, 23, 55, 110.
chrysozonus K. & Van H., 70.
chrysurus Desjardins, 22, 35, 109.
citrinellus Brouss., 23, 68, 110.
collare Bl., 22, 41, 109.
collaris Kner, 41.
cornutus Linn., 473.
diacanthus Bodd., 88.
dorsalis Cuv. & Val., 44.
ephippium Cuv. & Val., 23, 56, 110.
falcula Gthr., 46.
fasciatus Bl., 23, 50, 88.
fasciatus Forsk., 52, 54, 109.
flavescens Benn., 58.
flavus Rüpp., 52.
gahm Forsk., 411.
imperator Bl., 97.
karraf, 28.
kleini Bl., 23, 58, 110.
larvatus, 28.
leachii Cuv. & Val., 24.
lineatus Gmel., 420.
lineolatus Quoy & Gaimard, 22, 47, 109.
longimana Bl. & Schn., 5.
longirostris Brouss., 16.
lubiatus K. & Van H., 70.
lunatus Ehrenb., 47.
lunula Cuv. & Val., 50, 52.
macrolepidotus Linn., 76.
marginatus (Ehrenb.) Cuv. & Val., 44.
melanomystax Bl. & Schn., 58.
melanostomus Bl. & Schn., 58.
melanotus Bl. & Schn., 22, 44, 109.
mertensi Day, 35.
mesoleucus Bl., 101.
mesomelas Gmel., 101.
modestus (Schlegel), 22, 38, 109.
mulsanti Thiolliere, 56.
multicinctus Garrett, 60.
nesogallicus Cuv. & Val., 32.
nicobariensis Bl. & Schn., 98.
nigripes De Vis, 68.
octofasciatus Bl., 22, 39, 109.
oligacanthus Bleeker, 18, 19.
orbicularis Forsk., 105.
orbis Bl., 11.
ornatissimus (Soland.), 22, 42, 109.
oxycephalus Bleeker, 47.
pairatalis Buch. Ham., 8.
pepek Montr., 56.
plebeius Brouss., 21, 28, 109.
plebejus Gthr., 28.
polylepis Bleeker, 73.
praetextatus Cantor, 41.
Chætodon Artedi—Continued.
princeps Cuv. & Val., 36.
principalis Cuv. & Val., 56.
punctato-fasciatus Cuv. & Val., 23, 60, 110.
punctatus Linn., 3.
rafflesi Benn., 22, 36, 109.
rostratus Linn., 14.
sebae Cuv. & Val., 36.
sebanus Cuv. & Val., 30.
selene Bleeker, 23, 54, 109.
setifer Bl., 29.
speculum K. & Van H., 23, 66, 110.
sphenospilus Jenkins, 61.
strigangulus Soland., 21, 24.
strigatus Cuv. & Val., 72.
tallii Bleeker, 47.
taunay Quoy & Gaimard, 24.
tau-nigrum Cuv. & Val., 63.
teira Forsk., 105.
triangularis Rüpp., 24.
triangulum K. & Van H., 21, 26.
trifascialis Quoy & Gaimard, 24.
trifasciatus Mungo Park, 23, 63, 110.
trifasciatus var. *arabica* Steind., 63.
triostegus Linn., 407.
ulietensis Cuv. & Val., 22, 46, 109.
unicornis Forsk., 455.
unimaculatus Bl., 23, 61, 110.
vagabundus Linn., 21, 31, 32, 109.
vespertilio Bl., 105.
vinctus Benn., 65.
virescens Cuv. & Val., 58.
viridis Bleeker, 41.
vittatus Bl. & Schn., 63.
wiebeli Kaup, 52.
xanthurus Bleeker, 35.
zebra Lacép., 407.
(Gonochaetodon) triangulum (K. & Van H.), 26, 109.
(Megaprotodon) strigangulus (Soland.), 24, 109.
Chætodontidæ, 2, 13, 109.
Chætodontiformes, 1.
Chætodontoplus Bleeker, 81.
mesoleucus Bleeker, 101.
Chaetodontops Bleeker, 20.
Chalcophaps indica (Linn.), 217.
Chanos chanos (Forsk.), 294, 296, 303.
Chelmo Gthr., 14.
longirostris Gthr., 16.
Chelmon Cuv., 13, 14, 109.
longirostris Cuv., 16.
rostratus Cuv., 14.
rostratus (Linn.), 14, 109.
(*Forcipiger*) *longirostris* Steind., 16.
Chonophorus melanocephalus (Bleeker), 295, 297, 303.
ocellaris (Brouss.), 297, 303.
Christiopteris sagitta, 244.
Circus wolfi, 217.
Citharoedus Kaup, 20.
speculum Kaup, 66.

Clarias batrachus (Bl.), 295, 296, 303.
Cliniodes subcostalis Walk., 324.
totuanalis Schaus, **324.**
Clytiomya, 374.
Collocalia francia vanicorensis, 218.
Colocopus Gill, 435.
lambdurus Gill, 435.
Conopiden der Philippinen, 331.
Conopinæ, 331.
Conops Linn., 331, 332, 340.
annulosus Big., 333.
bakeri Kröb., 335, **340, 343.**
brevirostris Kröb., 333.
celebensis Meij., 334.
claripennis Brun., 334.
claripennis var. ceylonicus Brun., 334.
erythrocephalus F., 334.
frontosus Kröb., 334.
fulvicornis Kröb., 342.
gigas Macq., 334.
indicus Kröb., 334.
intermedius Brun., 334.
javanicus Dol., 334.
maculiventris Kröb., 334.
morosa de Meij., 334, 342.
nigripes Kröb., 334.
nigriventris Brun., 334.
nigrofasciatus Kröb., 334.
niponensis Voll., 340.
nubeculipennis var. *ornatus* Big., 335.
nubeculosus Big., 334, 340, 342.
nubeculosus Big. var. ornatus Big., 334, 343.
nubeculosus var. fulvicornis Kröb., 334.
olivaceus Kröb., 335, **340, 344.**
ornatus Big., 342.
pactyas Walk., 334.
philippinensis Kröb., 335, **340.**
pseudogigas Kröb., 334.
punctifrons Kröb., 334.
rufifrons Dol., 334.
rufofasciatus Brun., 334.
rufomaculatus Kröb., 334.
sepulchralis Brun., 334.
sumatrensis Kröb., 334.
testaceus Macq., 334.
teuthrediniformis Kröb., 334.
COPELAND, EDWIN BINGHAM, Davallodes and related genera, 239; The genus Calymmodon, 259.
Coradion Kaup, 14, 69, 110.
chrysozonus Kaup, 70.
chrysozonus (K. & Van H.), 70, 110.
desmotes Jordan & Fowler, 38.
modestum Jordan, Tanaka, & Snyder, 38.
Corvus pusillus Tweedd., 217, 224.
Coryphaena, 473.
Crocidolomia **subhirsutalis** Schaus, **324.**
suffusalis Hampson, 325.
Cromileptes altivelis (Cuv. & Val.), 303.
Cryptosmilia luna Cope, 5.
Cryptospylosia T. T., 388.
angustifrons T. T., 388, 389.
Ctenochaetus Gill, 404, 437.
striatus Jordan & Evermann, **439**, 440.
striatus (Quoy & Gaimard), **437.**
strigosus (Benn.), 437, 438, 440.
strigosus Jenkins, 438.
Ctenodon (Bon.) Klzgr., 437.
Culex, 118.
Culicoides judicaudus, 118.
Cystodium, 239.
Cystopteris, 245, 246.

D

Dahon gabi, 105.
Dalag, 295.
Dalagang bukid, 20.
Damagan, 302.
DANIELS, FARRINGTON, *see* VALENZUELA and DANIELS.
Davallia Sm., 239, 240, 242–246, 253, 254.
athamantica Christ, 241.
beddomei Hope, 241.
borneensi Mett., 249.
canariensis (L.) Sm., 253.
ciliata Hook., 247.
clarkei Baker, 241.
falcinella Presl, 251.
immersa Wall., 252.
multidentata Hook., 241.
pallida Mett., 252.
parvipinnula Hay., 241.
pentaphylla Blm., 254, 255.
perdurans Christ, 241.
pseudo-cystopteris Kze., 241.
pulcherrima Baker, 241.
pulchra Don, 241.
pycnocarpa Brack, 255.
rigidula Baker, 241.
solida, 243.
triphylla Hook., 256.
viscidula Mett., 249.
viscidula Mett. var. *novoguineensis* Rosenstock, 249.
wagneriana, 243.
yunnanensis Christ, 241.
(*Leucostegia*) *hosei* Baker, 251.
(*Leucostegia*) *kingii* Baker, 250.
(*Leucostegia*) *nephrodioides* Baker, 249.
Davallodes Copel., 239, 240, 242–245.
borneense (Hook.) Copel., 243, 245, 250.
borneensis, 251.
ciliata, 251.
congestum Copel., 245, 247.
dolichosorum Copel., 243, 245, 248.
grammatosorum Copel., 245, 248.
gymnocarpum Copel., 245, 246.
hirsutum (J. Sm.: Presl) Copel., 244, 247.
hosei, 251.
kingii Baker, 249, 251.
kingii Copel., 250.
laxum Copel., 245, 246.
membranulosa, 243, 245, 249.
nephrodioides Copel., 245, 249, 251.

Davallodes Copel.—Continued.
urceolatum Copel., **245, 248.**
viscidulum v. **A.** v. R., 245, 246, 248–250.
Dayapugan, 105.
Dendrophassa vernans (Linn.), 217.
Dennstaedtia, 239, 240, 245.
Dermacentor recticulatus, 132, 133, 138.
Diastephanus, 349.
albidens Kieff., 350, 359.
albifrons, 352.
albonotatus Elliott, 350, 359.
annulipes Elliott, **350, 354.**
clavatus Elliott, **350, 362.**
clavicoxis Elliot, **350, 358, 363.**
costifrons Elliott, **351, 363.**
curticollis Elliott, **350, 354.**
elongatus Elliott, **350, 356, 357.**
flavifrons Kieff., 350, 353.
flavonotatus Elliott, 350, 359.
leucodontus Schlett., 350, 360.
leucostictus Kieff., 350, 353.
levis Elliott, **350, 357,** 359.
longior Elliott, **350, 356.**
lucifer Elliott, **350, 355.**
multicolor Elliott, **350, 352.**
pallescens Schlett., 349, 352.
parvulus Elliott, **350, 361.**
punctinotum Elliott, **350, 358.**
semiglaber Elliott, **350, 361.**
trialbatus Elliott, **349, 351.**
Dichocrocis **dorsipunctalis** Schaus, **317.**
galmeralis Schaus, **317.**
Dictyoxyphium, 240.
Diellia, 240.
Diomedea irrorata, 220.
Disteira cyanocincta (Daudin), 296.
Doleschalla makilingensis T. T., **381.**
Dorong, 405.
DRAKE, CARL J., Tingitidæ from the Far East and Madagascar (Hemiptera), 307.
Drepane Cuv. & Val., 3, 109.
longimana (Bl. & Schn.), 3, 5, 109.
longimana Cuv. & Val., 5.
octofasciata Osorio, 5.
punctata Cuv. & Val., 3, 6, 7.
punctata Gthr., 5.
punctata (Linn.), 3, 109.
Drepanidæ, 2, **109.**
Dryococcyx harringtoni Sharpe, 217.
Dryopteris, 242.

E

Elasmognathus greeni Kby., 309.
helfneri Fieber, 309.
inusitatus Drake, **309.**
nepalensis, 309.
ELLIOTT, E. A., New Stephanidæ from Borneo and the Philippine Islands, III, 349.
Eocarceliopsis T. T., 392.
bakeri T. T., 392, **393.**
Ephippidæ, 2, 11, 109.
Ephippus Cuv., 11, 109.
argus Cuv., 8.
melanopus Bleeker, 12.
orbis (Bl.), 11, 109.
Epseudocyptera T. T., 369.
epalpata T. T., 369.
Esters of alpha linolic acid tetrabromide (methyl, ethyl, propyl, isopropyl, and allyl) from lumbang oil, 199.
Euhalidaya, 377.
Euhypochaetopsis T. T., 394.
orientalis T. T., 394.
Euphania, 381.
Eu-Polypodium, 260.

F

FAUSTINO, LEOPOLDO A., and **M.** SADERRA MASÓ, The Negros earthquake of 1925, 143.
Feronia americana Leach, 223.
spinifera Leach, 220.
Ferox, 278.
FERRIS, G. F., Fifth report upon Diptera pupipara from the Philippine Islands, 207.
Fifth report upon Diptera pupipara from the Philippine Islands, 207.
Fisheries of Lake Taal (Bombon), Luzon, and Lake Naujan, Mindoro, 287.
Forcipiger Jordan & McG., 13, 16, 109.
flavissimus Jordan & McG., 16.
longirostris (Brouss.), **16,** 109.
longirostris Fowler, 16.
Four new fishes from Lake Taal (Bombon), , 273.
Framboesia in Sumatra, 205.
Fregata aquila (Linn.), 220.

G

Genicanthus Swainson, 81.
Gerres punctatus Cuv. & Val., 297, 303.
Glossina, **120.**
Glosssinæ, 119, 120.
Glossogobius biocellatus (Cuv. & Val.), 297.
celebius (Cuv. & Val.), 295, 297, 303.
giurus (Buch, Ham.), 295, 297, 303.
Gnatholepis volcanus Herre, 297.
Goniophlebium, 244.
Gonochætodon Bleeker, 20, 25.
triangulum Jordan & Seale, 26.
Grammitis, 259, 260.
clavifer Hook., 268.
cucullata, 259, **266.**
subpinnatifida, 260.

H

Hæmatopota. 117, 118.
Halcyon, 208.
juliae, 208, 214.
veneratum, 207.
sp., 208.
Haliastur intermedius Gurney, **217.**
Harengula tawilis Herre, 273, 295, 296.

Harmidas diversatis Drake, 309.
pictus Dist., 310.
vicarius Drake, 310.
Harpochirus longimana Cantor, 5.
punctatus Cantor, 3.
Harpurus fasciatus Forst., 407.
lituratus Forst., 464.
paroticus Forst., 413.
Hemichætodon Bleeker, 20.
Hemirhamphus quoyi Cuv. & Val., 296.
Hemisturmia, 392.
Hemitaurichthys Bleeker, 14, 73, 110.
polylepis (Bleeker), 73, 74, 110.
Heniochus Cuv., 14, 73, 75, 110.
acuminatus Cuv. & Val., 75, 76, 110.
acuminatus Linn., 76.
chrysostomus Cuv. & Val., 80.
macrolepidotus Cuv. & Val., 76.
permutatus Benn., 76, 80, 110.
singularius Sm. & Radcliffe, 75, 77, 78, 110.
varius (Cuv. & Val.), 75, 78, 79, 110.
varius Gthr., 79.
Hepatus achilles Jordan & Evermann, 415.
aliala Jordan & Seale, 416.
atramentatus Jordan & Evermann, 422.
dussumieri Jordan & Evermann, 425.
elongatus Jordan & Evermann, 429.
guntheri Jordan & Evermann, 430.
lineatus Jordan & Seale, 420.
matoides Jordan & Evermann, 430.
olivaceus Jordan & Richardson, 413.
triostegus Jordan & Richardson, 407.
Hepsetia balabacensis (Seale), 274.
Hepsetia balabacensis (Seale), 296.
HERNANDO, EUGENIO, Life tables for the native resident population of the City of Manila for the year 1920, 161.
HERRE, ALBERT W., Hynnis momsa, a new Philippine pampano, 235; Four new fishes from Lake Taal (Bombon), 273; The Philippine band fishes, 281; The fisheries of Lake Taal (Bombon), Luzon, and Lake Naujan, Mindoro, 287; Philippine surgeon fishes and Moorish idols, 403.
HERRE, ALBERT W., and HERACLIO R MONTALBAN, The Philippine butterfly fishes and their allies, 1.
Hippobosca avicularia Linn., 211.
Hito, 295.
Holacanthus Lacép., 14, 81, 86, 88, 110.
bicolor (Bl.), 82, 91, 110.
bicolor Cuv. & Val., 91.
diacanthus (Bodd.), 82, 88, 110.
diacanthus Gthr., 88.
dux Lacép., 88.
ignatius Playfair, 103.
imperator (Bl.), 83, 97, 110.
imperator Cuv. & Val., 97.
lamarcki Lacép., 82, 83, 110.
lepidolepis Bleeker, 83, 103, 110.
leucopleura Bleeker, 90.
mesoleucus (Bl.), 83, 101, 110.
Holacanthus Lacép.—Continued.
mesoleucus Lacép., 101.
multifasciatus Sm. & Radcliffe, 82, 86, 110.
nicobariensis (Bl. & Schn.), 83, 98, 110.
nicobariensis Gthr., 98, 101.
nox Bleeker, 94.
semicirculatus Cuv. & Val., 83, 100, 110.
sexstriatus (K. & Van H.) Cuv. & Val., 82, 84, 110.
striatus Rüpp., 100.
tibicen (Cuv. & Val.), 82, 90, 110.
tricolor, 92.
trimaculatus Lacép., 83, 94, 95, 110.
vroliki Bleeker, 83, 92 110.
xanthometopon Bleeker, 83, 95, 110.
Humata Cav., 239, 240, 245, 253, 254.
heterophylla (Sm.) Desv., 253.
ophioglossa Cav., 253.
repens (L. f.) Diels, 253.
trifoliata Cav., 253.
Hynnis momsa Herre, 235.
Hypochaetopsis T. T., 394.
Hypseleotris modestus (Bleeker), 297, 303.
Hystricovoria T. T., 395.
bakeri T. T., 395.

I

Ichneumonops, 372.
Icosta Speiser, 220, 223.
Igat, 294.
Ilarches orbis Cantor, 12.
Indangan, 405.
Indongan, 425.
Isda kaba kaba, 20.

K

Kabubu, 79, 81.
Kalmin-kalmin, 473.
Kanduli, 300.
KELSER, R. A., Transmission of surra among animals of the equine species, 115.
Kikiro, 8.
Kitang, 8, 294, 302.
Kolibangbang, 20.
KRÖBER, O., Die Conopiden der Philippinen, 331.
Kuhlia marginata (Cuv. & Val.), 296, 303.
rupestris (Lacép.), 297, 303.
Kumai tullong, 445.
Kumay, 405.

L

Labahita, 405.
Lamprosema alicialis Schaus, 316.
bonitalis Schaus, 316.
Lañgaray, 299.
Lastrea Hook., 249.
borneensis Hook., 250.
Lates calcarifer (Bl.), 303.
Leaf fish, 105.
Leiognathus caballus (Cuv. & Val.), 296, 303.
Lepidochætodon Bleeker, 20.
Leptolepia, 240, 241, 254.

Leucostegia Presl, 240, 242, 243, 252.
hirsuta J. Sm., 247.
immersa (Wall.) Presl, 245, 252.
immersa amplissima Christ., 252, 253.
immersa nana, 252.
pallida (Mett.) Copel., 252.
parvipinnula Hay., 241.
yaklaensis Bedd., 241.
Leucotreron leclancheri Bp., 207, 217.
Lichtensteinipicus funebris (Val.), 217.
Life tables for the native resident population of the City of Manila for the year 1920, 161.
Lindsaya, 240.
Linophora Kaup, 20.
Liza melinopterus (Cuv. & Val.), 294, 296.
troscheli (Bleeker), 294, 296, 302, 303.
Lophosiodes, 384.
Lophosiopsis T. T., 381.
costalis T. T., 381, 382.
Lumas, 302.
Lumulukso, 293.
Luthianus argentimaculatus (Forsk.), 294, 297, 302, 303.
sp., 297, 303.
Luzonica, 276.
Lynchia Bequaert, 223.
Weyenbergh, 219, 223.
bicorna Ferris, 230.
dioxyrhina (Speiser), 232.
maura (Bigot), 219.
nigrita (Speiser), 228.
penelopes Weyenbergh, 219, 223.
pollicipes Ferris, 228.
sarta (Ferris), 224.
setosa Ferris, 224.
tuberculata Ferris, 224.
Lyperosia, 116, 117.
exigua, 118, 123–125, 138.

M

Macroconops Kröb., 331, 332.
Makilingimyia T. T., 382.
melanoptera T. T., 382, 383.
Malaga, 8.
Malipito, 295.
Maliputo, 294.
Managat, 302.
Margaronia **bakerialis** Schaus, 322.
bicolor Swains, 324.
lupinalis Schaus, 323.
MÁSO, M. SADERRA, *see* FAUSTINO and MASÓ.
Mayang, 3.
Medinacemyia T. T., 377.
sibuyana T. T., 377.
Megalops cyprinoides (Brouss.), 295, 296, 303.
Megaprotodon Guichenot, 20, 24, 29.
strigangulus Bleeker, 24.
trifasciatus Jordan & Seale, 24.
Meigenia, 375.
Merops americanus P. L. S. Müll., 213.
Microcanthus Swainson, 14, 71, 73, 110.
strigatus (Cuv. & Val.), 72, 110.
Microlepia, 239, 240, 242, 244, 245.
hirsuta Presl, 247, 249.
Mimorista Ware, 326.
Minthomyia, 365.
Mionurus bombonensis Herre, 296.
Monachosorum, 240.
Monoceros Bl. & Schn., 245.
annulatus Seale & Bean, 452.
biaculeatus Bl. & Schn., 455.
garretti Seale, 465, 467.
lituratus Seale, 465.
marginatus Seale, 452.
raia Bl. & Schn., 455.
tuberosus Seale & Bean, 458.
unicornis Evermann & Seale, 455.
MONTALBAN, HERACLIO R., *see* HERRE and MONTALBAN.
Moorish idols, 403, 470.
Mugil dussumieri Cuv. & Val., 302, 303.
Mungit, 405.
Muro ami, 404.
Muscadivores palawanensis (Blasius), 217.
Muslo, 294.
Myiophthiria Austen, 218.
Ferris, 218.
Rondani, 218.
capsoides Rondani, 218.
reduvioides Rondani, 218.
Myopa F., 331, 332.
cincta F., 334.
dorsalis F., 335.
nigriventris Brun., 335.
picta Pz., 335.
testacea L., 335.
Myopinæ, 331, 332.

N

Naseus (Commerson, MS.) Lacép., 445.
annulatus Bleeker, 452.
brachycentron Cuv. & Val., 448, 449.
brevirostris Cuv. & Val., 450.
carolinarum Cuv. & Val., 464.
fronticornis (Commerson) Cuv. & Val., 455.
hexacanthus Bleeker, 464.
hoedti Bleeker, 450.
literatus Cuv. & Val., 464.
marginatus Cuv. & Val., 452, 453.
olivaceus (Soland.) Cuv. & Val., 455, 457.
thynnoides Bleeker, 469.
tuber Cuv. & Val., 458.
tuberosus Gthr., 458.
vlamingii Cuv. & Val., 459.
Naso Lacép., 404, 445, 446.
brachycentron (Cuv. & Val.), 447, 448.
brevirostris (Cuv. & Val.), 447, 449, 450.
fronticornis Lacép., 455.
genimarginatus Herre, 447, 461.
hexacanthus (Bleeker), 447, 463, 464.
lituratus (Forst.), 448, 464, 467.
lopezi Herre, 448, 467.
marginatus (Cuv. & Val.), 447, 452.
thynnoides (Cuv. & Val.), 448, 469.
tuberosus Lacép., 447, 458.

Naso Lacép.—Continued.
unicornis (Forsk.), 447, 449, 455, 456.
unicornis Gthr., 455.
vlamingi, 447.
vlamingii (Cuv. & Val.), 459.
Negros earthquake of 1925, The, 143.
Nephrodium Hk., 249.
Nephrolepis, 239.
New Muscoidea from the Philippines region, 365.
species of Pyraustinæ from the Philippine Islands, 313.
Stephanidæ from Borneo and the Philippine Islands, III, 349.
Ngisi-ngisi, 8.
Note on frambœsia in Sumatra, 205.

O

Occemyia R.-D., 331, 332.
atra F., 335.
caenovalva Kröb., 335.
flavipes Brun., 335.
sauteri Kröb., 335.
simillima de Meij., 335.
Ochrophasia T. T., 374.
atripennis T. T., 374.
Ocypteropsis, 369.
Ocypterula, 370.
Odontosoria, 240.
Okeopsis, 393.
Oleandra, 239, 244, 245.
Olfersia Wied., 220, 223.
diomedeae (Coq.), 220, 222.
spinifera (Leach), 220.
vulturis Van der Wulp, 220.
Ophicephalus striatus Bl., 295, 297, 303.
Ophiocara aporos Bleeker, 295, 297, 301, 303.
Opsocyptera T. T., 370.
optima T. T., 370, 371.
Orectocera, 385.
Orilliopsis T. T., 396.
orientalis T. T., 396.
Oriolus albiloris Gr., 217.
Ornitheza Speiser, 211, 213.
metallica (Schiner), 213.
Ornithoctona Speiser, 211, 215, 218.
magna Ferris, 216, 217.
nigricans (Leach), 215, 217.
nigricans (Leach) Speiser, 216.
Ornithodorus crossii, 119.
Ornithoica beccariina Rondani, 209–211.
confluenta (Say), 207, 208, 211.
exilis (Walk.), 211.
philippinensis Ferris, 210.
podicipis von Röder, 211.
promiscua Ferris & Cole, 207, 209–211.
pusilla (Schiner), 207–211.
rondani, 207.
stipituri (Schiner), 211.
turdi (Latr.), 211.
unicolor Speiser, 209–211.
vicina (Walk.), 211.
Ornithomyia Latr., 211, 218.
avicularia (Linn.), 211, 213.
lagopodis Shp., 213.
nigricans Leach, 215.
pusilla Schiner, 207.
(*Ornithoctona*) *nigricans* (Leach) Austen, 216.
Ornithopertha, 211.
Ornithoponus Aldrich, 219, 220, 223.
Ferris, 223.
americana, 223.
Oxychætodon Bleeker, 20.
Oxydexiops T. T., 375.
uramyoides T. T., 375.

P

Paederus F., 399.
baŕerianus Bernh., 401.
bang-haasi Bernh., 400.
flaviceps Bernh., 401.
grandicollis Bernh., 401.
intermedius Boh., 399.
lativentris Wendeler, 400.
lividus Bernh., 401.
philippinus Bernh., 399.
samarensis Bernh., 399.
semiviridis Bernh., 400.
Pait, 299.
Palawan, 301.
Palpocyptera T. T., 369.
pulchra T. T., 369, 370.
Paracanthurus Bleeker, 404, 435.
hepatus Blkr., 435.
lambdurus (Gill) Blkr., 435.
Parachætodon Bleeker, 14, 18, 109.
ocellatus Bleeker, 18.
ocellatus Cuv. & Val., 18, 109.
Parathelaira, 378.
Paro-paro, 20.
Penelopides manillæ (Bodd.), 209, 217, 230.
Petroscirtes **ferox** Herre, 277, 297.
Phapitreron amethystina Bp., 217.
Philippine butterfly fishes and their allies, 1.
band fishes, 281.
surgeon fishes, 403.
Philippinen, Die Conopiden der, 331.
Die Staphyliniden der, 399.
Philippodoria T. T., 391.
fasciata T. T., 391.
Philippoformosia T. T., 368.
splendida T. T., 368.
Philippolophosia T. T., 384.
ornata T. T., 384.
Phorichaeta, 390.
Phostria aengusalis Schaus, 314, 316.
celsusalis Schaus, 315.
discipunctalis Hampson, 316.
druonalis Schaus, 315.
hillalis Schaus, 313.
mimastis Meyr., 315.
origoalis Walk., 314.
primulosalis Schaus, 314.

Physocephala Schiner, 331, 332, 336.
albofasciata Brun., 332.
amoena, 333, 340.
ammophiliformis Kröb., 332, 338.
annulata Kröb., 333.
annulifera Brun., 332, 339.
argentifera Brun., 333, 337.
assamensis Kröb., 333.
aterrima Kröb., 333.
atricornis Brun., 333.
aurantiaca Brun., 333.
aureopygia Kröb., 333.
bicolor Brun., 333, 339.
bipartia Dol., 333, 335–337.
calopa Big., 333.
calopus Big., 340.
diffusa Brun., 333.
limbipennis de Meij., 333, 335–337, 339, 340.
lugens Voll., 333.
munda Brun., 340.
mundus Brun., 333.
nigrofasciata Brun., 333.
nursei Brun., 333.
philippinensis Kröb., 335, 336, 338.
pusilla, 339, 340.
quadrata Brun., 333.
rufescens Brun., 333.
sauteri Kröb., 333, 338.
scutellata Kröb., 333.
sumatrensis Kröb., 333.
tenella Big., 333.
Pilocrocis **polialis** Schaus, 313.
Pinkit, 301.
Pitta atricapilla Lesson, 207.
vigorsi, 208.
Platacidæ, 2, 104, 110.
Platax Cuv., 1, 104, 110.
ocellatus Cuv. & Val., 18.
orbicularis Cuv. & Val., 105, 107, 108.
orbicularis (Forsk.), 105, 110.
teira Cuv., 105, 107, 108.
vespertilio Cuv., 105, 108.
vespertilio japonicus Schlegel, 105.
sp., 108.
Plectopteris calymmodon, 266.
gracilis Fée, 266.
Pleuroceriella Brun., 332.
dioctriaeformis Brun., 335.
Polygrammodes **ephremalis** Schaus, 326.
Polypodium, 259, 260.
calymmodon Fée, 266.
calymmodon v. A. v. R., 266.
clavifer Hook., 268.
conduplicatum Brause, 268.
consociatum v. A. v. R., 266.
cucullatum Nees & Blm., 259, 261, 266.
cucullatum var. *planum* Copel., 267.
gracillimum Copel., 261.
muscoides Copel., 264.
pergracillimum v. A. v. R., 263.
subgracillimum v. A. v. R., 261.
vulgare, 239.
Polypodium—Continued.
(*Phymatodes*) *albido-squamatum*, 244.
(*Phymatodes*) *glauco-pruinatum*, 244.
Pomacentrus lunula Lacép., 52.
tripunctatus Cuv. & Val., 297.
Priodon annularis Cuv. & Val., 452.
annulatus Quoy & Gaimard, 454.
hexacanthus Bleeker, 463, 464.
Prioniturus cyaneiceps Sharpe, 228.
Prionurus coume Lesson, 464.
Priopis buruensis (Bleeker), 296.
gymnocephalus (Lacép.), 296.
Pristis microdon Latham, 303.
Prognathodus longirostris Bleeker, 16.
Proparathelaira T. T., 378.
plumosa T. T., 378.
Prophorichaeta T. T., 390.
philippina T. T., 390.
Prosaptia, 239, 254.
Pseudocyptera, 369.
Pseudodexia, 366.
Pseudokea T. T., 393.
neowinthemioides T. T., 393, 394.
Pseudolfersia, 220, 223.
spinifera (Leach), 220.
Pseudolynchia Bequaert, 219.
maura (Bigot), 219.
Pseudorectocera T. T., 385.
albifacies T. T., 385.

R

Rabdophorus Swainson, 20.
Ray tapis, 407.
Rhinogobius **flavoventris** Herre, 276, 297.
Rhodogyne **philippensis** T. T., 388.
Rhytidoceros plicatus Forst., 232.
Riring, 3.

S

Saccoloma, 239.
Salias, 405.
Samara, 425.
Samaral, 405.
Sameodes **alexalis** Schaus, 325.
ennoduisalis Schaus, 326.
finbaralis Schaus, 325.
oduphalis Schaus, 326.
ulricalis Schaus, 325.
SANTOS, IRENE, and AUGUSTUS P. WEST, Esters of alpha linolic acid tetrabromide (methyl, ethyl, propyl, isopropyl, and allyl) from lumbang oil, 199.
Sarathrodus Gill, 20.
Scatophagidæ, 2, 7, 109.
Scatophagus Cuv. & Val., 2, 7, 109.
argus (Bodd.), 8, 109.
argus Cuv. & Val., 8.
argus (Gmel.), 294, 297, 303.
ornatus Cuv. & Val., 8.
SCHAUS, W. New species of Pyraustinæ from the Philippine Islands, 313.
Schizoloma, 240.

Scyphularia Fée, 240, 242, 245, 254.
pentaphylla, 254–256.
pycnocarpa (Brack.) Copel., **254, 255.**
simplicifolia Copel., 254, 256.
sinusora Copel., **254, 255.**
triphylla (Hook.) Fée, 254, 256.
Serenthia formosana Mats., 312.
sedalis Drake, **312.**
vicinalis Drake, **311.**
Sicus Scop., 331, 332.
ferrugineus L., 335.
vaginalis Kröb., 335.
Sillago sihama (Forsk.), 297, 303.
Simbad, 301.
Sisyropododexia T. T., **367.**
luteicornis T. T., 367, **368.**
Spathidexia, 367.
Spilopelia tigrina (Temm. & Knip), 217, 219.
sp., 208.
Spylosia, 388.
Staphyliniden der Philippinen, 399.
Stomoxys, 117, 119.
calcitrans, 116, 118, 119, 121–126, 138.
geniculatus, **116.**
Strongyloneura nepalana T. T., 376.
Strongyloneuropsis T. T., 376.
malayensis T. T., **376.**
Sturmiodoria T. T., **391.**
facialis T. T., 391, **392.**
Stylogaster, 331.
bakeri Bezzi, 331, 335.
orientalis Brun., 331, 335.
Stylogasterinæ, 331.
Sumatrodexia, 378.
Surgeon fishes, 403.
Sylepta **azadesalis** Schaus, **320.**
banosalis Schaus, **318.**
berambalis Schaus, **318.**
cathanalis Schaus, **318.**
chalybifascia Hampson, 322.
dottoalis Schaus, **321.**
elphegalis Schaus, **320.**
marcarealis Schaus, **321.**
mildredalis Schaus, **321.**
petroalis Schaus, **319.**
simealis Schaus, **319.**
Syngramma, 240.
Syrnium sp., 208.

T

Tabanidæ, 119.
Tabanus, 116, 117.
albimedius, 119.
***evansi*, 118.**
striatus, 118, 119, 124–131, 137.
Taenioides caeculus (Bl. & Schn.), 297.
cirratus (Blyth), **303.**
Taenitis, 240.
Tagan, 298.
Talahib, 298.
Talocogan, **105.**
Tapay tapay, 20, 81.
Tapeinidium, 240, 254.
Taurichthys varius Cuv. & Val., 79.
chrysostomus Bleeker, 80.
macrolepidotus Bleeker, 76.
Tawilis, 274, 295.
Teiro, 81.
Tetragonoptrus Bleeker, 20.
Klein, 19.
auriga Bleeker, 30.
bennetti Bleeker, 65.
collaris Bleeker, 41.
ephippium Bleeker, 56.
fasciatus Bleeker, 52.
kleini Bleeker, 58.
lineolatus Bleeker, 47.
melanotus Bleeker, 44.
mertensi Bleeker, 35.
miliaris Bleeker, 68.
octofasciatus Bleeker, 40.
ornatissimus Bleeker, 42.
polylepis Bleeker, 74.
punctato-fasciatus Bleeker, 60.
rafflesi Bleeker, 36.
selene Bleeker, 54.
speculum Bleeker, 66.
triangulum Bleeker, 26.
trifasciatus Bleeker, 63.
ulietensis Bleeker, 46.
unimaculatus Bleeker, 61.
vagabundus Bleeker, 32.
xanthurus Bleeker, 35.
Teuthis achilles Fowler, 415.
aliala Jordan & Evermann, 416.
annularis Fowler, 430.
argenteus Jordan & Fowler, 425.
atramentatus Jordan & Evermann, 422.
australis Gray, 407.
dussumieri Jenkins, 425.
guntheri Jenkins, 430.
hepatus L., 435.
lineatus Seale, 420.
matoides Jenkins, 430.
olivaceus Jordan & Evermann, 413.
Therapon cancellatus Cuv. & Val., 303.
jarbua (Forsk.), 297, 303.
Theraponidæ sp., 297.
Thermal and photochemical decomposition of caryophyllene nitrosite, 187.
Tholichthys Gthr., 1, 10, 20.
Thriponax hargitti Sharpe, 217.
Tingitidæ from the Far East and Madagascar (Hemiptera), 307.
Toxotes jaculatrix (Pallas), 297, 303.
Trachypeplus bakeri Drake, 308.
jacobsoni Horvath, 309.
Transmission of surra among animals of the equine species, 115.
Trichomanes canariense L., 253.
Trichostylum **fasciatum** T. T., **380.**
Trogostolon Copel., **240, 242, 251.**
falcinellus (Presl) Copel., **251.**
Trypanosoma brucei, 116.
evansi, 117, 119, 120, 122–124, 129, 130, **133, 134,** 136–138.
gambiense, 17.

Trypanosoma brucei—Continued.
lewisi, 117.
theileri, 136.
Tudlo-an, 448, 450, 455.
Tutilodexia, 368.
TYLER-TOWNSEND, CHARLES H., New Muscoidea from the Philippines region, 365.

U

Umayi, 435.
Urodexiomima T. T., 366.
uramyoides T. T., 366, 367.
Uroeuantha T. T., 365.
longipes T. T., 365, 366.

V

Vaimosa macrognathus Herre, 297, 303.
piapensis Herre, 297.
VALENZUELA, PATROCINIO, and FARRINGTON DANIELS, Thermal and photochemical decomposition of caryophyllene nitrosite, 187.
VAN DRIEL, B. M., Note on frambœsia in Sumatra, 205.

W

WEST, AUGUSTUS P., *see* SANTOS and WEST.

X

Xanthosyntomogaster, 373.
Xenotingis **trepidantis** Drake, 310.

Z

Zambesa Walk., 371, 385.
makilingensis T. T., 382, 387.
Zambesoides T. T., 371.
samarensis T. T., 371, 372.
Zanclidæ, 470.
Zanclus (Commerson MS.) Cuv. & Val., 471.
(Commerson MS.) Lacép., 471.
canescens Gthr., 472, 476.
canescens Jordan & Fowler, 473.
canescens (Linn.), 472.
centrognathus Cuv. & Val., 472.
cornutus Cuv. & Val., 472, 473, 476.
cornutus (Linn.), 473.
montrouzieri Thiolliere, 472.
ruthiae Bryan, 472.
Zebrasoma Swainson, 404, 441.
flavescens (Benn.), 441, 443.
flavescens Jordan & Evermann, 441.
hypselopterus Jenkins, 443.
rhombeum Jordan & Seale, 441.
rhombeus, 443.
veliferum (Bl.), 441, 443.
veliferum Jordan & Evermann, 443.
Zenarchopterus dispar (Cuv. & Val.), 296.
Zizyphomyia, 391.
Zodion Latr., 331, 332.
cinereum F., 334.
griseum Brun., 334.
montanum Brun., 334.